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An Evaluation of Swing-Bed Experiments to Provide Long-Term Care in Rural Hospitals

Volume II: Final Technical Report

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An Evaluation of Swing-Bed Experiments to Provide

Long-Term Care in Rural Hospitals

Volume II: Final Technical Report

This report was made pursuant to contract No. SSA-600-77-0051 between ORDS/Health Care Financing Administration and the Center for Health Services Research, University of Colorado Health Sciences Center.

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In Memory of James Baker

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This report is dedicated to the memory of Mr. James Baker. Jim was the original project officer on this study and was highly instrumental in facilitating several activities of the swing-bed evaluation in its early stages. For the entire project staff, his untimely death resulted in the loss of a friend, a fine individual, and a competent professional colleague whose career had just begun. While we wish we could offer more than an evaluation report series, it is the best means available to us in a professional forum to express our genuine appreciation for the contribution which Jim made and our sincere regrets that he is no longer with us.

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Peter W. Shaughnessy

PREFACE

The report series on the evaluation of the swing-bed experiments in Utah, Texas, Iowa, and South Dakota consists of several documents, all of which are listed in the "References" section of this report. This document is the second of two volumes which contain final results of the evaluation of three swing-bed projects: the two Reducing Acute Care Costs (RACC) experiments in Texas and western Iowa/South Dakota, and the Iowa Swing-Bed Project (ISBP) in central Iowa. Volume I, the summary report, describes the overall findings and implications of the evaluation and is intended for a non-technical audience.

This volume is the technical report and contains, in addition to findings and implications, a discussion of the methodological aspects of the evaluation including data sources and statistical methods. Some of the material presented here has appeared in previous reports, in particular, the September 1979 draft technical report which dealt chiefly with preliminary findings based on 1977 data from the two RACC experiments. Specific data collection instruments and forms are included in the "Data Forms Supplement" to this report.

An overview of the swing-bed approach and related policy issues is presented in Chapter I. The second chapter provides a history of the swing-bed experiments. Chapters III through VI describe the methods, findings, and implications of the organizational, utilization, quality, and financial components of the evaluation. Chapter VII presents the overall conclusions and policy-specific recommendations of the evaluation on the implementation of a nationwide swing-bed program.

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ABSTRACT

This report contains a technical description of the evaluation of the swing-bed experiments in Texas, Iowa, and South Dakota. Under these experiments, 82 rural hospitals were permitted to provide long-term care in hospital beds normally restricted to the provision of acute care. Two key features characterized the experiments: (1) a waiver of certain regulatory standards usually required of long-term care providers and (2) a reimbursement approach based on incremental cost.

For each of the major components of the study the report provides an overview of the analytic approach, a description of the data sources and methods employed, and a presentation of findings and policy recommendations. A history of the swing-bed experiments is also included.

The major conclusions of the study are:

(1) It is appropriate to implement a national swing-bed program in rural areas.

(2) Such a program would be of benefit to rural communities in terms of meeting both long-term care and acute care needs.

(3) Assuming reimbursement is based upon the concept of incremental cost of care, the swing-bed approach is a cost-effective means of providing long-term care.

(4) A number of financing, quality assurance, and regulatory issues must be considered in structuring a national swing-bed program. Recommendations on these topics are provided.

Volume I of this report series contains an overview of the study and a summary of the findings and policy recommendations.

CHAPTER I

INTRODUCTION

A. RATIONALE FOR SWING-BED CARE IN RURAL COMMUNITIES

Despite the progress which has been made in reducing some of the discrepancies between rural and urban communities in terms of access to health care services, health care in many rural areas is still characterized by a shortage of qualified personnel and a lack of comprehensive medical services. Consequently, it is not unusual for rural residents to travel great distances to obtain health care. Such access problems can, on many occasions, be more than simply a matter of inconvenience. Accessible emergency care in a acute care hospital may represent the difference between long-term disability and complete recovery, high cost and low cost of care, or even life and death under certain circumstances. In the area of long-term care, the lack of adequate nursing home care in a rural community may result in the placement of long-term care patients in distant nursing homes, thus hindering the ability of family and friends to visit and limiting the quality of the psychosocial environment. Given the long stays usually associated with nursing home care, this has the potential to impede the delivery of adequate long-term care to residents of rural communities.

To assist in meeting the medical needs of rural residents, the Hill-Burton program was initiated in the 1940s as a means of providing federal funds for the construction of rural hospitals. Although the program provides the potential for attracting physicians and developing centers for comprehensive health services, the demand for acute care is uneven in many rural communities. Small rural hospitals usually lack the financial advantages which can accrue from economies of scale and shared service arrangements more commonplace in metropolitan areas; and thus, while hospitals have been constructed in many rural areas, such facilities are often financially unstable and faced with possible closure. Medicare- and Medicaid-certified rural nursing homes, in contrast, are often characterized by high occupancy rates and patient waiting lists.

In response to this dilemma of an excess of hospital beds and a scarcity of certified nursing home beds in rural communities, the swing-bed concept was proposed. The term "swing-bed" refers to a hospital bed which can be used to provide care to either acute or long-term care patients. The ability to use beds in this manner allows an acute care hospital to provide care to patients who might more traditionally receive care in a nursing home.[1]

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[1]Long-term care need not be provided only in an institutional environment such as a hospital or nursing home. In this report, however, the primary emphasis is on the institutional setting.

In 1973, the Department of Health, Education, and Welfare (DHEW) funded an experimental program in Utah to determine whether the use of hospital swing beds would assist in satisfying the demand for long-term care in rural communities and improve the stability of rural hospitals. In 1976 and 1977, three additional swing-bed experiments were initiated in Texas, South Dakota, and Iowa to allow further empirical investigation of the advantages and disadvantages of providing long-term care in hospital swing-beds in rural communities.

The swing-bed experiments made several assumptions about the health care delivery system in rural areas:

(1) An unmet demand for institutional long-term care exists in many communities;

(2) Surplus staff capacity is present in a number of rural, under-occupied hospitals;

(3) Provision of adequate long-term care may be possible in a hospital setting if staff members are sufficiently well-acquainted with the administrative and patient-level aspects of providing such care;[2]

(4) The provision of long-term care in existing rural hospitals is potentially more cost-effective than other alternatives in meeting the demand for institutional long-term care;

(5) There are advantages which would accrue to long-term care patients and their families and friends from the convenience associated with visiting the long-term care patients in their own communities instead of more distant locations; and,

(6) There are substantial benefits to rural areas in maintaining community hospitals: namely, the continued availability of acute care, the diversification of the service program of rural hospitals, and the maintenance of such hospitals as vital parts of the economies of rural communities.[3]

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[2]The traditional medical model on which hospital care is based often fails to emphasize the importance of the psychosocial and functional problems of the chronically ill. Hence, genuine concern existed from the outset that hospital-based long-term care might be inadequate in these areas.

[3]The wholesale closure of 20% of all rural hospitals in 1977 would have resulted in less than a 3.5% reduction in total hospital costs in the U.S., a percentage far below the annual inflation rate for hospital costs in this country. The true cost reduction would very likely have been less than 2.5% since the 3.5% figure assumes no transfer cost, which is highly unlikely.

B. REGULATORY HISTORY

In view of the fact that the experimental swing-bed approach represents a partial return to an earlier health care practice of hospitals caring for both acute and long-term care patients, it is appropriate to examine why the practice was discontinued. With the inception of Medicare and Medicaid, it was required that if a hospital was to be reimbursed for long-term care by Medicare or Medicaid, it must first be certified by DHEW to provide that care.[4] Certification covers two levels of long-term care, skilled and intermediate, which are discussed below. Regulatory requirements also called for a hospital to provide a physically distinct part (such as a building, wing, or corridor) exclusively for the provision of long-term care.

Certification conditions require that long-term care facilities, including hospital distinct-part facilities, provide such specialized services as physical therapy, social services, and patient activities. These are services in addition to those required for the hospital to receive Medicare and Medicaid reimbursement for acute care and are intended to establish minimum standards for the quality of care provided to Medicare and Medicaid patients. Despite the fact that hospitals automatically satisfy several long-term care certification standards by virture of acute care certification, there are certain long-term care certification criteria which hospitals do not routinely satisfy. In order to meet such criteria, it would be necessary for many hospitals to incur additional costs, a requirement which can act as a disincentive to provide long-term care.

Since long-term care is generally less expensive than acute care, a facility must have a mechanism for appropriately reporting its long-term care costs. Specifically, if a hospital were not to maintain a distinct part, it would be difficult to separate long-term care costs from acute care costs, and for third-party payers to properly reimburse for their fair share of hospital costs. Establishment of a distinct part exclusively for long-term care, however, limited the capability of a hospital to use beds in the most efficient and cost-effective manner. As a result of reimbursement policy and certification procedures, the typical circumstances under which hospitals were able to provide both acute and long-term care in the same facility were therefore changed significantly with the advent of Medicare and Medicaid.

Due in part to regulatory stringency and the administrative inconve-

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[4]The three major types of long-term care, skilled nursing, intermediate, and personal care, are described and defined in greater detail in Section C. Medicare certifies and reimburses only for skilled nursing care whereas Medicaid certification applies to both skilled nursing and intermediate care facilities. The certification criteria for Medicare and Medicaid are termed "conditions of participation".

nience associated with Medicare reimbursement, the number of beds in Medicare-certified free-standing skilled nursing homes and hospital-based distinct parts decreased during the late Sixties and early Seventies, although this downward trend has shown a reversal in recent years. Between 1968 and 1975, the number of Medicare-certified skilled nursing care beds decreased from 337,000 to 287,000 nationwide; but, by 1977, the total had increased to 381,000 beds (SSA 1977). Rural communities in particular have a shortage of such beds. For example, in 1974, just prior to implementation of the swing-bed experiments in South Dakota, Iowa, and Texas, rural counties in these states averaged five, three, and one Medicare-certified skilled nursing care beds per 1,000 Medicare enrollees, respectively. The comparable figure for the entire United States was 15 certified beds per 1,000 Medicare enrollees.

A provision currently exists in Medicare policy to handle situations where long-term care beds are lacking. It allows hospitals to provide long-term care at acute care rates if it can be documented that a nursing home bed is not available for the patient (HCFA 1977, Section 3421.2 (A)). Patient days of care allowed under this provision are sometimes referred to as "administratively necessary days". A similar concept for Medicaid, termed the "holding bed", has been advocated in various states. Under this approach, hospitals are able to hold a Medicaid patient in acute care status until a nursing home bed becomes available. These options entail higher reimbursement outlays for third party payers, however, and are not considered appropriate for widespread use.

C. LONG-TERM CARE

The difference between acute care and long-term care naturally arises in a discussion of swing-bed care. As opposed to acute care patients, whose medical problems usually require short-term, high intensity treatment, long-term care patients are often chronically ill and/or disabled. Included in this category are patients with chronic physical and/or mental disease, or mental retardation. Those most prone to chronic disease, and thus most often requiring long-term care, are the elderly. While the needs of long-term care patients are usually not as medically intense as the needs of acute care patients, one of the challenges to the adequate provision of long-term care is the diversity of functional, psychosocial, and medical needs of the long-term care patient. "Quality of life" is a more appropriate goal in the provision of long-term care as opposed to acute care, due to the range of patient needs and the greater lengths of stay typically associated with long-term care.

There are three generally recognized levels of long-term care:

(1) The <u>skilled nursing care</u> patient is one whose acute care needs have been met but who still requires extended nursing care under the supervision of both a physician and registered nursing personnel. A Medicare-/Medicaid-certified skilled nursing facility

must have a transfer agreement with an acute care hospital to promptly provide acute care services when necessary.[5] Almost all skilled nursing care is paid for by Medicare, Medicaid, or private payers (primarily patients themselves).[6]

(2) Intermediate care patients generally require supportive nursing care which can often be provided by a licensed practical nurse rather than a registered nurse. Care at the intermediate level is beyond that available at boarding homes and, as a practical matter, is usually available only through institutional facilities. Medicaid and private payers (primarily patients themselves) pay for intermediate care.

(3) Personal care normally refers to residential care which is essentially custodial in nature and is the primary function of boarding and rest homes. Neither Medicare nor Medicaid reimburse for personal care and it is almost exclusively paid for on a private pay basis.

Nationally, Medicaid is the dominant purchaser of institutional long-term care services. The Medicare SNF benefit, on the other hand, was not initially intended to result in Medicare becoming a substantial purchaser of long-term care services. Rather, it was intended to reduce the unit cost to the Medicare program of maintaining sub-acute patients in acute care hospitals (i.e., to provide sub-acute skilled nursing care, as opposed to either the continuous physician care available in the hospital or the prolonged custodial care provided in many nursing homes). Some state Medicaid programs have more refined long-term care classification schemes than that given above. Also, different patient care practices and reimbursement rates are generally associated with the various levels of long-term care. Related to patient classification is the need for an effective and efficient utilization review system for patient admission, placement, and length of stay, a need which has existed for some time in acute care and is now beginning to increase in significance in long-term care settings.

D. POLICY ISSUES

The swing-bed approach should be considered in the context of several major health care issues. A brief summary of the primary policy issues

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[5]This transfer agreement requirement supports the contention that skilled nursing facilities should ideally be located near acute care hospitals, a potential difficulty in rural communities.

[6]Unlike acute and ambulatory care, which involve a large number of commercial insurers, only a few commercial insurers cover, on a very limited basis, long-term care.

related to swing-bed care is provided below.

1. Finance/Reimbursement

It is essential to develop an appropriate mechanism for financing long-term care provided in hospital swing beds. The method of paying for such care, the manner in which it meshes with current reimbursement policy, and the financial incentives it presents for hospital providers of long-term care are likely to be strong determinants of the success of a swing-bed program.

2. Demand for Long-Term Care

The appropriateness of swing-bed care should be considered in view of a presently unmet and still growing demand for long-term care services in many communities. While outpatient and home health care as alternatives to institutional care are receiving more attention nationally, it appears important to move forward in the institutional area in view of the apparent need for such care in many rural communities, although outpatient or home health care may be preferable for at least some rural patients.

3. Hospital Diversification and Rural Health Care

The swing-bed approach may be viewed as a potential means of financially stabilizing rural hospitals through diversification of service mix. To the extent that this approach increases rural hospital diversification and financial stability, it also serves to meet needs other than those related directly to long-term care. Specifically, it increases the likelihood of maintaining the rural hospital as a center for health services, a point of access to acute and emergency care, and as a means of attracting needed health care professionals. Further, activities directed toward the stabilization of the rural hospital can be regarded as an effort to maintain a significant element of the economy in many rural communities.

4. Regulatory Flexibility

Various facets of swing-bed care test the adaptiveness and flexibility of the health care regulatory system. Issues of certificate of need, nursing home licensure for hospitals, professional licensure for hospital administrators (nursing home administrators must be licensed in nearly all states), the adaptation of reimbursement policy to incorporate swing-bed reimbursement, and the manner in which to apportion swing beds between acute care and long-term care for planning purposes are illustrations of the challenges which a health care innovation such as the swing-bed approach presents to the regulatory system.

5. Cost Containment

Under the assumption that it is possible to take advantage of existing hospital capacity to provide long-term care, it is reasonable to expect that the unit cost (the cost per day) of such care would be less than that associated with building new nursing homes. However, it can also

be assumed that current health care costs would increase slightly since an unmet demand appears to exist for long-term care in many rural areas. Thus, if this demand is to be met, total health care costs are likely to rise despite the fact that the swing-bed program might be the most cost-effective means to meet the demand.[7]

6. Quality Assurance/Utilization Review

The increasing trend toward quality assurance and utilization review in long-term care also affects care provided in swing beds. In fact, there is reason to be concerned that hospitals, many of which are inexperienced in addressing the broad spectrum of psychosocial and functional needs of long-term care patients, may not be as qualified as some types of nursing homes to provide such care. Consequently, development of quality assessment, quality assurance, and utilization review programs for long-term care provided in swing beds is important and should not be overlooked.

7. Eligibility Criteria

If a swing-bed program were to be implemented nationally, a major decision would focus on which hospitals would be eligible. In particular, decisions would have to be made on whether eligibility criteria should be specified in terms of hospital occupancy rates, number of beds, geographic location (rural versus urban), availability of certified nursing home beds in the community, and, in general, which criteria should apply in the certificate of need process.

E. PURPOSE OF THE EVALUATION

1. Experimental Settings

The four swing-bed experiments were designed to assess the efficacy of the swing-bed approach in rural areas. The Utah Cost Improvement Project (UCIP), the two Reducing Acute Care Costs (RACC) experiments in Texas and western Iowa/South Dakota, and the Iowa Swing-Bed Project (ISBP) in central Iowa permitted rural hospitals in a number of communities to provide long-term care without meeting all the conditions of participation normally required for reimbursement for the provision of such care to Medicare and Medicaid patients.

This report is primarily concerned with the RACC experiments in Texas and western Iowa/South Dakota, and the ISBP experiment (termed the "central Iowa" project in this report). The Utah findings have been presented in earlier publications (see Shaughnessy 1978a and 1978b). Mention is made of the Utah experience in this report as appropriate.

The 83 hospitals which formally agreed to participate in the experimental programs (39 from Texas in 1976, 22 from western Iowa/South

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[7]Although, as discussed in Chapter VI, Section E.4, the total increase in hospital care costs is likely to be less than 0.05%.

Dakota in 1976, and 22 from central Iowa in 1977) ranged in size from 15 to 94 beds with an average of 37 beds per hospital in 1975.[8] The average acute care occupancy rate in 1975 was 45.1%, ranging from 19.4% to 80.0% across the 83 hospitals.

2. The Evaluation Study

The primary intent of the evaluation is to provide information on the overall functioning and strengths and weaknesses of the swing-bed approach, with a view toward facilitating decisions on more widespread implementation of swing-bed care. The remainder of this chapter is devoted to a brief overview of the entire evaluation, which is organized into five components: organization, utilization, quality, finance, and policy. The purpose of each component is summarized below, along with appropriate data sources and research methods used. Other information on specific technical methods, variable definitions, samples used, years of data analyzed, etc., is contained in Chapters III through VI, the appendices, and the Data Forms Supplement.

(1) Organization

Purpose: The purpose of the organizational component is to determine whether and how a national swing-bed program should be implemented from the perspective of acceptance by hospital staff and nursing home administrators. Facility and project characteristics are related to acceptance of the swing-bed approach, benefits and problems with providing long-term care in acute care hospitals are examined, and suggestions made by swing-bed hospital and nursing home administrators for implementation of a national swing-bed program are considered.

Data: The major data sources were surveys of swing-bed hospital administrators, directors of nursing, chiefs of staff, staff physicians, and nursing home administrators. In the evaluation of the operation of the swing-bed experiments, the primary focus was on the staffs of participating hospitals. In the analysis dealing with implementation of a national swing-bed program, however, emphasis was placed on information obtained from nursing home as well as hospital staff members.

Methods: The organizational evaluation employed standard descriptive and statistical methods, including logistical analyses. Tabular results are presented with indicators of statistical procedures used and significance levels as appropriate.

(2) Utilization

Purpose: The utilization component is designed to describe the acute and long-term care utilization patterns associated with the experimental swing-bed programs. Specifically, it is intended to assess

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[8]Twenty-two hospitals from western Iowa/South Dakota entered the project, but one hospital in South Dakota closed due to the loss of its only physician. Therefore, it was excluded from the analyses and subsequent references in this report are to 82 study hospitals.

the influence of the availability of swing-bed care on acute care length of stay and occupancy rates in swing-bed hospitals, and on nursing home utilization by residents of swing-bed communities. Also included is a forecast of utilization in the event of national implementation of a swing-bed program.

Data: The primary data sources were Medicare Cost Reports, project logs completed by the hospitals and monitored by the state level administering agencies, Medicare claim forms, and information obtained from state health departments, Medicaid programs, and administering agencies.

Methods: The utilization component employed standard descriptive and statistical procedures, including discriminant function and multiple regression analyses. In forecasting swing-bed utilization in the event of a national program, predictions were first made of the number of rural hospitals likely to admit swing-bed patients using a discriminant function procedure; regression analysis was then used to forecast the number of patient days of swing-bed care provided.

(3) Quality of Care

Purpose: The quality component is intended to assess the quality of long-term care provided by the experimental swing-bed hospitals relative to that provided by Medicare- and Medicaid-certified skilled nursing facilities. Thirty swing-bed hospitals and 15 comparison nursing homes in rural communities in Texas, South Dakota, and Iowa were visited in order to obtain information on the quality of care provided. Due to the selection process, the 15 facilities were assumed to provide above average care in comparison with other nursing homes. The quality component focuses exclusively on services provided to long-term care patients, rather than changes in patient status over time in the two facility types. It also includes an analysis of case mix differences between swing-bed and comparison nursing home patients.

Data: Information was collected on a patient-by-patient basis by an evaluation staff nurse experienced in long-term care. Data on the quality of care provided was gathered on 6,859 occasions of service, 597 patient problems, and 158 patients in the 45 facilities.

Methods: A multidisciplinary panel of experts in long-term care assisted in the development of explicit criteria which enumerate the services patients with specific types of long-term care problems should receive. The criteria incorporated the previous work of other long-term care providers and researchers. Separate quality measures were computed at the levels of services provided, patient problems, patients, and facilities. Univariate statistical methods as well as discriminant and regression analyses were employed in this component of the evaluation.

(4) Finance

Purpose: The primary objective of the financial evaluation is to

assess the cost, both full and incremental, of providing long-term care in swing-bed hospitals.[9] Emphasis is placed on incremental cost since (1) the experiments were partly premised on incremental cost methods, (2) the incremental cost of long-term care in swing-bed hospitals is less (by definition) than full cost which is thus in keeping with the notion of taking advantage of the acute care base of the hospital to provide long-term care, and (3) reimbursement policy can be structured to cover the incremental cost of long-term care in swing-bed hospitals. Several implications presented here would be different if full cost were regarded as the most appropriate cost.

The financial evaluation is also concerned with the impact of the experiments on the financial position of the participating hospitals. Reimbursement procedures and problems have been monitored throughout the experiments. A conference, which included participants experienced with swing-bed reimbursement, was held in the latter stages of the evaluation to obtain suggestions on how to structure reimbursement policy for swing-bed care, taking issues such as incremental cost, incentive payments, and payer mix into consideration.

Data: Medicare Cost Report and claims data, and supplemental cost and utilization information provided by both individual hospitals and the agencies administering the experiments, constituted the primary data bases analyzed in the financial component of the study.

Methods: The methods involved in assessing the cost of providing long-term care in swing-bed hospitals were developed with a practical approach to reimbursement in mind. Different allocation schemes and incremental cost methodologies were employed as part of this component of the evaluation. Costs were examined on an individual cost center basis, with an effort to separate variable costs (i.e., those which vary solely as a function of utilization) from fixed costs (such as capital costs).

(5) Policy

Purpose: The objective of this component is to direct the analytic procedures and empirical findings of the overall evaluation toward policy-relevant conclusions. This component, therefore, presents policy conclusions through an integration of the findings and implications of the four components described above. Topics covered in these

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[9]In this context, incremental cost refers to the "add-on" cost of providing long-term care in a facility which already exists to provide acute care. In contrast, the full cost of long-term care in a swing-bed hospital refers to the cost which would be calculated by appropriately allocating all components of hospital cost to long-term care. Thus, full cost is based on the assumption that the hospital exists to provide both acute and long-term care, and that capital costs, etc., should be allocated to both acute and long-term care.

components such as cost-effectiveness, reimbursement policy, regulatory adaptation, interpretation of utilization and cost projections in the context of a national program, state level considerations, etc., all pertain to the policy component. While findings and implications are presented separately in each of the other components, the policy component synthesizes the implications according to regulatory and health care topic areas which provide a summary of the conclusions from a policy perspective.

3. Organization of the Report

While the general features of the swing-bed experiments have been presented in this introductory chapter, the next chapter is devoted exclusively to historical information on the swing-bed experiments and associated programmatic and operational details relevant to an understanding of the findings and implications presented elsewhere in this report. Chapters III through VI deal with the organization, utilization, quality, and financial components of the study, respectively. Each chapter contains an overview of the respective evaluation component, followed by a detailed description of the data and methods used. Findings are then presented with minimal interpretive or inferential comments. The final section of each chapter deals with policy, programmatic, and research implications drawn from the findings. Chapter VII presents the overall policy conclusions of the evaluation. The appendices contain background information relating to various aspects of the experiments and the evaluation.

CHAPTER II

HISTORY

A. INTRODUCTION

This chapter presents background information on the development, organization, and project-level administration of the RACC experiments in Texas and western Iowa/South Dakota, and the Iowa Swing-Bed Project (ISBP) in central Iowa.[1] Section B contains information on the characteristics of these experiments, including an overview of the key features of the swing-bed approach, and discussion of the chronology of the experiments and administering agencies involved, licensure and certificate of need requirements, per diem rates, educational programming, Medicaid participation, and selection of participating hospitals. Section C provides a comparison of project hospitals with other rural community hospitals in Texas, South Dakota, and Iowa.

B. PROJECT CHARACTERISTICS

It proves useful to a discussion of the RACC and ISBP experiments to begin with a brief summary of the key experimental features, since they are fundamental to an understanding of the swing-bed approach. Essentially, two aspects of the Medicare program were modified for purposes of the experiments. The first (discussed in more detail in in Chapter V, Section B.2) involved a waiver of the conditions of participation which normally govern the provision of long-term care in Medicare-certified nursing facilities. Under the experiments, participating hospitals were not required to comply with certain skilled nursing facility (SNF) certification requirements in order to be reimbursed for long-term care. These certification requirements, as indicated earlier, have restricted the availability of long-term care beds in many rural areas.

A second feature of the swing-bed experiments (elaborated fully in Section C of Chapter VI) pertained to the reimbursement procedures followed and involved a waiver of the standard Medicare cost reimbursement principles.[2] Medicare reimbursement for routine long-term care

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[1]For a history of the Utah swing-bed experiment, see Shaughnessy et al. (1978b).

[2]Waivers of (1) the Medicare conditions of participation for skilled nursing facilities and (2) the Medicare cost reimbursement principles were approved under Section 402(a)(1) of the Social Security Amendments of 1967, as amended by Section 222(b) of the Social Security Amendments of 1972, which allows waivers for experimental purposes.

in certified skilled nursing facilities or hospital-based distinct-part facilities is based on the cost to the institution of providing that care.[3] However, under the experiments, participating hospitals were not reimbursed on a cost basis; rather, reimbursement consisted of a per diem payment (uniform within each experiment) for skilled nursing care and an incentive payment intended to encourage hospital participation in the swing-bed program. Reimbursement for ancillary long-term care was handled in accord with the normal Medicare procedure for acute care.[4] The central Iowa project differed from the RACC experiments in that no incentive was included in the reimbursement formula.

Medicaid and private pay patients also received long-term care in some participating hospitals, although Medicaid's participation in the Medicare experiments, as discussed below, did not begin until well after their implementation. Medicaid reimbursement consisted of a per diem payment for skilled care in Texas and separate per diem payments for skilled and intermediate care in South Dakota. Unlike Medicare, however, Medicaid reimbursement did not include an incentive payment. Ancillary reimbursement was handled in accord with standard Medicaid procedures. In Iowa, Medicaid participated only to the extent of paying coinsurance for dual Medicare/Medicaid beneficiaries. Private pay patients were generally charged at the per diem rates used by Medicare and Medicaid and were billed for ancillary services on a fee-for-service basis.

In the final Medicare settlement, hospital long-term routine care revenues from all sources were offset against total routine care costs, thus reducing the Medicare allowable routine cost and cost settlement (hence, the experimental name "Reducing Acute Care Costs"). The RACC incentive payment, in turn, represented 50% of this "savings", or reduction in Medicare allowable acute care cost, attributable to the provision of long-term care. An incentive was also included in the reimbursement scheme employed in the original swing-bed experiment in Utah, although the formula for the calculation of the incentive was somewhat different from that employed in the RACC experiments. (A full discussion of the RACC incentive is presented in Chapter VI, Section C.4.)

1. Project Chronology and Administering Agencies

In August 1974, the Social Security Administration (SSA) issued a request for proposals (SSA-RFP-75-0021) concerning the swing-bed approach

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[3]Routine care refers to those services which consist of basic room and board, nursing, and similar services which are routinely provided to all patients.

[4]Ancillary care refers to diagnostic, laboratory, pharmacy, and related services usually given on a discretionary basis in accord with patients' needs.

in rural areas which would replicate the then ongoing swing-bed experiment in Utah (UCIP). Due to the restrictive limitations of the RFP, however, the number of hospitals meeting the basic eligibility criteria in the proposals received in response to the RFP was not sufficient to meet the sampling criteria specified for selection; and thus, no contracts were awarded. A revised RFP (SSA-RFP-0145) with less restrictive eligibility criteria was subsequently released in March 1975 soliciting offers to conduct the same type of experiments. (Further elaboration of the eligibility criteria for hospital participation in the experiments is provided in Section B.6.)

Pursuant to the second RFP, contracts to administer the RACC experiments in Texas and western Iowa/South Dakota were awarded to the Texas Hospital Association (THA) and Blue Cross of Western Iowa and South Dakota, respectively, effective July 1, 1975. Although implementation of the experiments was originally scheduled to begin in January 1976, the first long-term care patients were not admitted to participating hospitals in either Texas or western Iowa until July 1976, and in South Dakota, until August 1976. This delay was due to a number of factors. First, SSA ruled in December 1975 that formal agreements of participation should be signed between each participating hospital, the administering agency involved, and SSA prior to admission of long-term care patients. Negotiation between SSA and the administering agencies on these agreements continued throughout the early months of 1976. Second, SSA did not approve the requisite waivers of the SNF conditions of participation and cost reimbursement principles until May 1976, although such approval was necessary before the assignment of SNF provider numbers to the participating hospitals by the Bureau of Health Insurance. Third, neither THA nor Blue Cross of Western Iowa and South Dakota completed the educational training program required by SSA for participating hospitals prior to the January 1976 implementation date. Fourth, in the western Iowa/South Dakota experiment, negotiation between Blue Cross and SSA on the per diem reimbursement rates to be used in the two states was not completed until May 1976. Finally, a legal controversy arose in South Dakota over the applicability of that state's certificate of need law to the provision of long-term care under the RACC experiment and was not resolved until June 1976.

The contract to administer the RACC experiment in western Iowa/South Dakota was made directly with the Medicare fiscal intermediary, Blue Cross of Western Iowa and South Dakota. Under terms of the contract, Blue Cross received funds to cover additional Medicare audit activities and processing costs associated with the experiment. The Texas contract, however, was not with the Medicare intermediary, Group Hospital Services (Blue Cross), but with the Texas Hospital Association. SSA reimbursed GHS directly for its administrative expenses from a separate account established out of funds approved for experimental studies.

In November 1975, Blue Cross of Iowa submitted an unsolicited proposal to SSA entitled "Use of Empty Hospital Beds for Long-Term Patients", outlining an experiment similar to the RACC experiments but, as indi-

cated above, with unique reimbursement procedures. SSA awarded a contract to Blue Cross of Iowa, the Medicare fiscal intermediary for central Iowa, to administer the ISBP experiment in February 1977.[5] Many of the procedural details which delayed implementation of the RACC experiments were resolved by the time the ISBP experiment came into existence; and thus, the central Iowa project was able to begin on scheddule in June 1977. Under the terms of its contract with SSA, Blue Cross retained no governmental funds to cover the cost of administration or audit activities related to the experiment and the ISBP project was administered as a special Blue Cross program. The ISBP exexperiment, in sum, differed from the RACC experiments not only in respect to reimbursement policy, as indicated previously, but in respect to governmental funding for administrative expenses.

The RACC experiments were originally designed to end on September 30, 1978; no new patients were to have been admitted after June 30, 1978. Likewise, in central Iowa, patients were originally scheduled to be admitted through December 31, 1978, with reimbursement for swing-bed care continuing through March 1979. The contracts for the three projects, however, were extended several times. At this writing, the projects are scheduled to terminate concurrently with the adjournment of the 96th Session of the United States Congress, on or about January 1, 1981, with a 90-day grace period for stay but not admission.

2. Licensure and Certificate of Need

SSA required that the administering agencies obtain exemptions from nursing home licensure and certificate of need requirements from the appropriate state agencies before hospitals admitted swing-bed patients. THA obtained a letter from the Texas Bureau of Health Resources stating that nursing home licensure for swing-bed hospitals was not required. Similarly, Blue Cross of Western Iowa and South Dakota obtained letters from the Iowa and South Dakota Departments of Health stating that no change in the status of the hospitals' licenses would be necessary for participation in the experiments. The nursing home licensure requirement was waived in the three states because an acute care hospital license was considered to cover the lower levels of care provided under the experiments. Blue Cross of Iowa was not required to obtain a separate exemption when the central Iowa hospitals entered the ISBP experiment because the licensure requirement had already been waived for Iowa hospitals participating in the RACC experiment in western Iowa.

Relatively few problems were encountered by THA in dealing with the Texas certificate of need requirements. THA requested and received a letter from the Texas Health Facilities Commission stating, in es-

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[5]The RACC and ISBP experiments were originally funded by the SSA but with the reorganization of DHEW in 1977, came under the direction of the Office of Demonstrations and Evaluations of the Health Care Financing Administration (HCFA).

sence, that no action from the commission regarding certificate of need would be required as the experiment called for a reduced level of care for some patients, did not require nursing home licensure, and involved no construction, modification, or expansion of existing facilities. In South Dakota, however, a problem arose as to whether the South Dakota certificate of need law required participating hospitals to obtain a certificate of need prior to providing long-term care. The Director of the South Dakota Comprehensive Health Planning Program (CHPP) initially indicated in a December 1975 letter to Blue Cross of Western Iowa and South Dakota that a certificate of need would not be required "where a hospital had previously provided less than acute care services within their facility".

The South Dakota nursing home association (South Dakota Association of Health Care Facilities (SDAHCF)), however, challenged the non-applicability of certificate of need for the provision of long-term care in South Dakota hospitals and threatened a court injunction to block implementation of the experiment. In this regard, there was apparently a misunderstanding on the part of members of SDAHCF that hospitals participating under RACC could provide skilled nursing care even when a Medicare certified SNF existed in the same community as the participating hospitals; and, as a result, their main concern was that the experiment would hurt nursing home occupancy in the future.

The Director of CHPP, under pressure from SDAHCF, subsequently reconsidered his earlier decision and in April 1976 requested a legal opinion from the South Dakota Attorney General. Implementation of the experiment in South Dakota was therefore delayed until the Attorney General issued an opinion on the certificate of need issue. In a letter to the Secretary of the Department of Health, dated July 12, 1976, the Attorney General stated that "the possible applicability of the certificate of need law to this situation is at best doubtful". He concluded that since there was to be no construction or modification of an existing building in any hospital as part of the swing-bed experiment, the certificate of need law did not apply. The Attorney General's opinion therefore cleared the way for the August 1976 implementation of the RACC experiment in South Dakota hospitals. Certificate of need did not become effective in Iowa until July 1, 1978; and thus, did not apply to the RACC hospitals in western Iowa or the ISBP hospitals.

3. Per Diem Rates

Since Medicare reimbursement is not normally based on fixed per diem payments, the administering agencies were required to submit proposed per diem rates for Medicare skilled nursing care in their responses to the swing-bed RFP. SSA did not actually establish rigid limitations on the per diem rates that could be adopted; rather, the matter was left open to negotiation with the administering agencies after contracts were awarded but before implementation of the experiments began. Certain guidelines, however, were outlined by SSA in the RFP and reimbursement at the rates recommended by the administering agencies was subject to SSA approval. The original guidelines indicated

that the Medicare skilled nursing rates to be used in participating hospitals should take into account such factors as: (1) the objectives of the experiment; (2) the prevailing long-term care costs in the states; and (3) current reimbursement for long-term care by third-party payers. SSA further specified that the Medicare skilled nursing rate should not exceed the Medicaid SNF rate recognized in the project states. This was essentially the same rate setting procedure followed in the Utah swing-bed experiment; i.e., Medicaid set the per diem rate for skilled care and Medicare reimbursed at that rate.

Negotiation on the rate-setting procedure varied by project, although in none of the experiments did the SSA-approved Medicare per diem rates exceed the Medicaid SNF rates in the project states. In Texas, THA proposed and SSA approved the statewide average Medicaid SNF rate. In the western Iowa/South Dakota experiments, Blue Cross initially proposed separate rates for participating hospitals in western Iowa and South Dakota based upon differing Medicaid rates in the two states. However, Blue Cross reconsidered its original recommendation and in December 1975 proposed that the Iowa rate (the higher of the two) be applied to both states because, as they argued, the Medicaid SNF rate in South Dakota was artificially low and was based on a formula that did not reflect the actual cost of services rendered patients (South Dakota Medicaid, unlike Iowa Medicaid, does not reimburse on an actual cost basis for SNF care; instead, it applies a cost-related formula to arrive at a reimbursement rate). Blue Cross further justified its recommendation on the grounds that the difference in hospital routine service costs between the two states was negligible (less than 1.5%); and, they argued that the cost of rendering Medicaid skilled nursing care did not differ materially between the two states. After lengthy negotiation, SSA concluded in April 1976 (after converting the South Dakota Medicaid reimbursement rate for skilled care to cost) that a significant difference in costs did indeed exist between the two states and that the per diem rates for the RACC experiments should reflect this difference. In the final settlement on this matter, therefore, the Medicare per diem in South Dakota was set at a rate projected to equal the statewide average Medicaid SNF rate; and, in western Iowa, the average cost of Medicaid SNF care in Iowa was adopted. In central Iowa, the per diem was also set at the statewide average cost of Medicaid SNF care; however, the per diem was set at a higher rate than that in western Iowa because the central Iowa project began a year later than the RACC experiment in western Iowa and the average cost of Medicaid SNF care in Iowa had increased over the interim period between implementation of the two experiments.

4. Educational Programs

So that the goals and procedures of the experiments would be understood, the administering agencies were also required to provide, subject to SSA approval, an education and training program for participating hospital staff prior to the admission of long-term care patients. Although the design and implementation of these programs was project specific, they shared the common focus of providing education and training for the hospital administrative and medical staff members

involved in the provision of long-term care. They were also intended to acquaint the general public with the swing-bed program. In meetings with hospital and administrative staff, emphasis was placed on education about financial matters, changes in Medicare Cost Reports, billing procedures, and the skilled nursing services which would be reimbursed under the experiments. The perceived importance of physician approval of the programs prompted emphasis on explanation to physicians of the advantages of the swing-bed approach and the roles they would play in the success of the experiments. Training sessions in the provision of long-term care were held for nursing personnel in each of the participating hospitals. These sessions dealt with the philosophy and practice of skilled nursing care and related topics. Public meetings were also held in the communities served by the swing-bed hospitals to explain the benefits of the experiments to both the hospital and residents of the communities.

In Texas, THA apparently had some difficulty in settling on an acceptable educational program and SSA did not approve the THA program until May 1976. In their response to the RFP, THA had proposed that the educational program be subcontracted to a team from the University of Houston. After the award of the RACC contract, however, proposals were solicited for this activity, but the submitted proposals were rejected as economically unfeasible, insufficient, or requiring too much time for implementation. Alternate plans were subsequently explored and several universities were contacted, but stringent time requirements prevented the involvement of these institutions. THA thereafter abandoned the effort to find a suitable subcontractor to conduct the educational program and prepared a program internally which received the approval of SSA. Two nursing consultants were hired to conduct the nursing education aspect of the program. Group Hospital Services, the Medicare intermediary, conducted orientation sessions for the administrative staff of the participating hospitals, and THA staff were utilized for instruction in other areas.

In the western Iowa/South Dakota experiment, a nursing consultant was employed to provide training for nurses while Blue Cross staff members conducted the educational program in the other areas. In central Iowa, the educational program was developed and presented by the Iowa Hospital Association under a subcontract with Blue Cross as part of its contractural agreement with SSA. The Iowa Hospital Association subcontract represented the only governmental funds involved in administering the central Iowa project.

5. Medicaid Participation

Medicaid did not participate in the initial stages of either the RACC or ISBP experiments, although the Medicaid programs in both Texas and South Dakota indicated a willingness to participate as early as May 1975. In Texas, the major obstacle to Medicaid participation concerned the regulatory standards for Medicaid certification. Negotiations between THA and the relevant governmental agencies on this matter were lengthy. THA contacted the state Department of Health Resources, the the Texas Nursing Home Association, the Bureau of Health Insurance, and the state Department of Public Welfare in an attempt to secure

the participation of the Medicaid program. Texas Medicaid, however, would not make a formal commitment to participate in the experiment until SSA approved the Medicare waivers (of cost reimbursement principles and conditions of participation for skilled nursing facilities) so that the specific Medicaid waiver requirements could be designed to coincide as closely as possible to Medicare's waivers. In early 1977, the Texas Department of Public Welfare applied for and subsequently received an experimental waiver under Section 1115 of the Social Security Act. Because of administrative delays, however, Medicaid patients were not admitted to RACC hospitals in Texas until January 1978.

Blue Cross of Western Iowa and South Dakota conferred frequently in 1975 and 1976 with the Iowa and South Dakota Departments of Health about Medicaid participation in the RACC experiments in those states. The major problem, as in Texas, concerned the regulatory standards for Medicaid certification, and Medicaid was reluctant to commit to the program until after the Medicare waivers were approved by SSA. In South Dakota, Medicaid participation was opposed by SDAHCF because of potential competition between swing-bed hospitals and nursing homes. Consequently, Medicaid would not commit to the RACC experiment until the legal controversy over the certificate of need issue, mentioned previously, was resolved. Subsequent to SSA approval of the Medicare waivers and the South Dakota Attorney General's July 1976 opinion regarding the nonapplicability of the South Dakota certificate of need law to RACC hospitals, the South Dakota Department of Health secured Medicaid Section 1115 waivers. As a result, Medicaid began participation in the South Dakota RACC experiment in January 1977. Unlike Texas Medicaid, however, Medicaid in South Dakota agreed to reimburse for both skilled and intermediate levels of long-term care.

The Iowa Medicaid program apparently did not feel that a shortage of Medicaid certified skilled nursing beds existed in that state. Medicaid reimburses primarily for intermediate level nursing care in Iowa and could not be convinced that reimbursement for skilled nursing care under the swing-bed experiments would be cost-effective for the Medicaid program. Iowa Medicaid did agree in the third quarter of 1977, however, to pay the coinsurance for dual Medicare/Medicaid beneficiaries for the 21st through the 100th day of skilled care.

6. <u>Hospital Selection</u>

The revised RFP issued by SSA in 1975 specified that between 10 and 40 hospitals serviced by the same intermediary and meeting certain eligibility criteria could participate in each new experiment. The criteria included: (1) location in an area where long-term care facilities were inaccessible and/or inadequate; (2) location in a rural area, i.e., in an outlying area of a county having a population not exceeding 50,000, or in a community having a population not exceeding 25,000; (3) low acute care patient occupancy rate, averaging less than 80% (optimally less than 60%) during each of the three years preceding July 1, 1974; (4) less than 100 (optimally less than 70) acute care beds; (5) a staff-to-patient ratio (full time equivalent (FTE)) not more than two standard deviations (optimally one standard deviation)

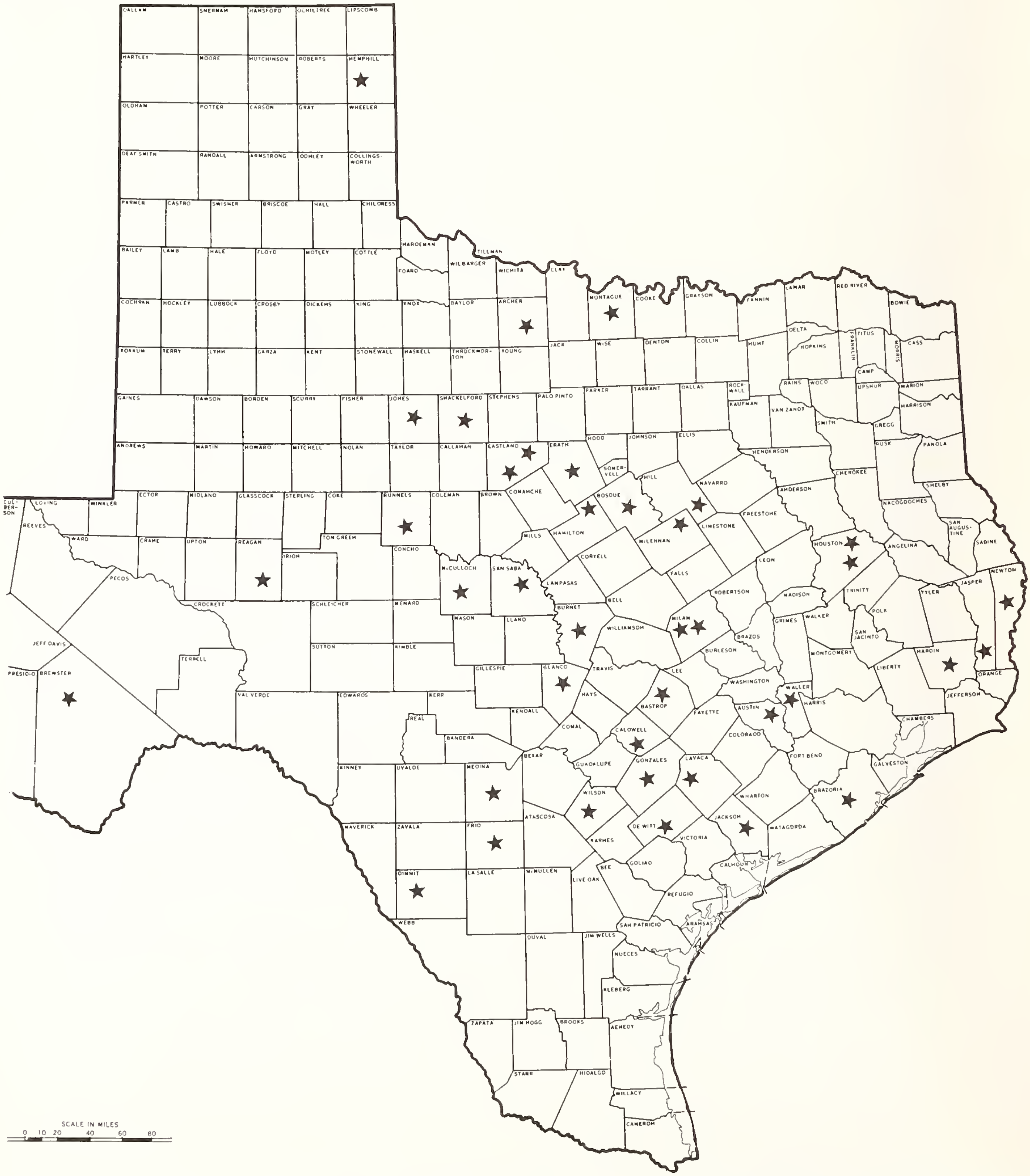
from the average of all hospitals in the state of the same bed size (plus or minus five beds), as of July 1, 1974; and (6) total number of FTEs not exceeding the FTE average for the hospital for the preceding five years by more than 20% (optimally 10%).

Prior to replying to the RFP, the Texas Hospital Association publicized the potential community service benefits of the RACC experiment and sent invitational letters to 210 hospitals which met the minimum criteria. Tentative commitments to participate were, at that time, received from 33 hospital administrators whose hospitals were, in fact, nominated for participation in the experiment by THA in their response to the RFP. Interest in the experiment among rural hospitals continued, however, and during the implementation stage of the experiment, a list of 49 hospitals was submitted to SSA for approval. Subsequent analysis of these hospitals disqualified several because of insufficient staffing, administrative problems, or proximity to Medicare certified skilled nursing facilities. In addition, a number of hospitals withdrew during implementation because of administrative delays, increased hospital acute care occupancy, anticipation of additional expenses not reimbursable under the experiment, and excessive paperwork. In order to replace these hospitals, a second enlistment effort was undertaken. All rural Texas hospitals tentatively meeting the criteria for participation were identified and informed of the experiment (with the notice that the deadline for entry was October 31, 1976). As a result of the two enlistment efforts, a total of 39 hospitals signed formal agreements of participation and became eligible to admit long-term care patients under the RACC experiment. Of those, however, 13 formally withdrew over the course of the project, reducing the participants in Texas to 26 hospitals. The location of the 39 Texas hospitals originally signing agreements of participation is shown in Figure II.1 and a complete listing of these hospitals is presented in Appendix A.

During October 1974, and prior to submitting their response to the RFP, personnel of Blue Cross of Western Iowa and South Dakota contacted 19 hospitals which met the eligibility criteria outlined in the RFP. Of the 19 hospitals contacted, five either expressed little interest in the swing-bed program or made a tentative commitment and later withdrew. Ten hospitals in South Dakota and four in western Iowa were therefore nominated for participation by Blue Cross in their response to the RFP. Three of the original ten South Dakota hospitals, however, decided not to sign agreements of participation and were replaced by three other South Dakota hospitals which had requested approval for participation. On March 1, 1977, three additional hospitals in western Iowa and five additional hospitals in South Dakota were approved by SSA, resulting in a total of seven Iowa hospitals and 15 South Dakota hospitals participating in the experiments. One hospital in Iowa later withdrew due to lack of acceptance in its service area and one hospital in South Dakota closed because it lost its physician. In sum, of the 22 that signed agreements of participation, 20 hospitals in western Iowa and South Dakota participated throughout the experimental period. The location of the 22 original Iowa and South Dakota hospitals is indicated in Figures II.2 and II.3, respectively, and the individual hospitals are listed in Appendix A.

FIGURE II.1:

Location of Texas RACC Hospitals.



In central Iowa, a preliminary list of 24 hospitals expressing interest in the ISBP experiment was submitted to SSA by Blue Cross in their unsolicited proposal. Two of these hospitals were rejected by SSA and the number of participants was set at 22.[6] Two of these did not sign formal agreements with SSA and were replaced by two others which had expressed interest in the project.[7] Seventeen of the 22 hospitals were approved by SSA for participation during the second quarter of 1977, with the remaining five receiving approval during the third quarter of 1977. Since the commencement of the experiment in central Iowa, one swing-bed hospital merged with a larger hospital and one hospital that never admitted swing-bed patients withdrew from the experiment, leaving 20 hospitals which participated throughout the project. The location of the 22 hospitals originally entering the central Iowa project is also shown in Figure II.2, with individual hospitals listed in Appendix A.

In summary, a total of 83 hospitals signed agreements to participate in the RACC and ISBP experiments and were therefore defined as "participating hospitals" for purposes of the evaluation. However, results in each of the four components of the evaluation are based on a subset of these 83 hospitals. The organization evaluation is based on 82 hospitals because one hospital closed before the organization surveys were administered. The utilization and financial components are based primarily on hospitals which admitted swing-bed patients during the study years, ranging from 12 in 1976 to 50 in 1978. The quality component is based on a sample of 30 hospitals selected from all three projects.

C. COMPARISON OF PROJECT HOSPITALS WITH RURAL HOSPITALS IN THE PROJECT STATES

The conditions imposed on hospital eligibility by the experimental selection criteria restricted the extent to which participating hospitals are representative of rural hospitals in the three project areas or in the nation as a whole. Consequently, a statistical comparison of project and non-project hospitals provides both a descriptive overview of the hospitals upon which the study findings are based and a measure of the extent to which the findings can be generalized to rural hospitals and geographic areas outside of the experimental communities. Table II.1 presents a comparison of hospitals participa-

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[6]One of the hospitals rejected by SSA had over 100 beds. The other had operated a Medicare-certified distinct part up until a month before the project started.

[7]One of the administrators who decided not to sign reported that he felt reimbursement was inadequate and was concerned about "red tape" required to get swing-bed patients approved. The other administrator who did not sign reported that, although he wanted to participate in the experiment, his hospital had recently expanded from a 21 bed to a 35 bed facility and he wanted to increase his staff, but the additional personnel were not allowed under the experiment.

FIGURE II.2:

Location of Western Iowa RACC Hospitals and Central Iowa ISBP Hospitals.

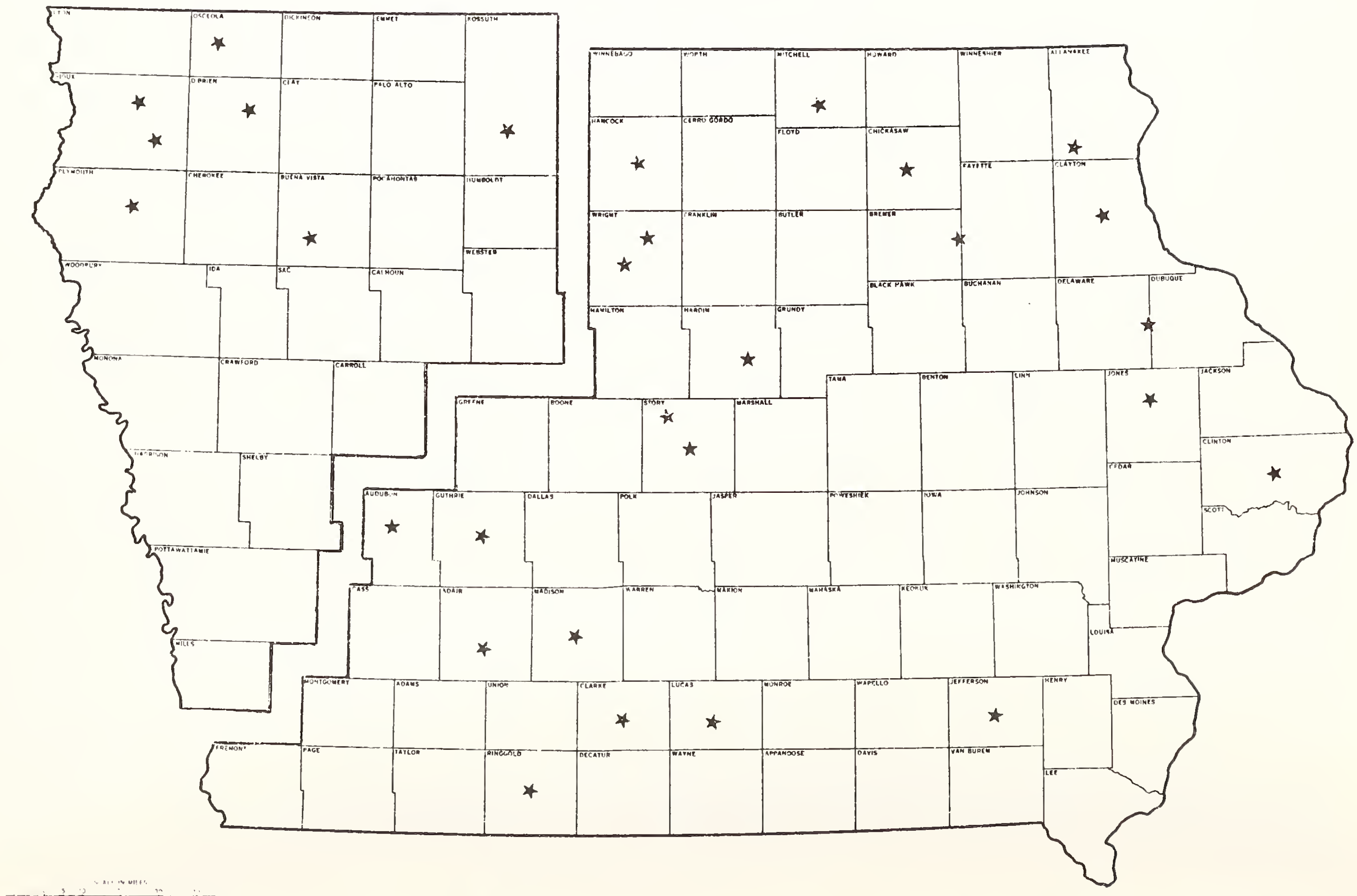
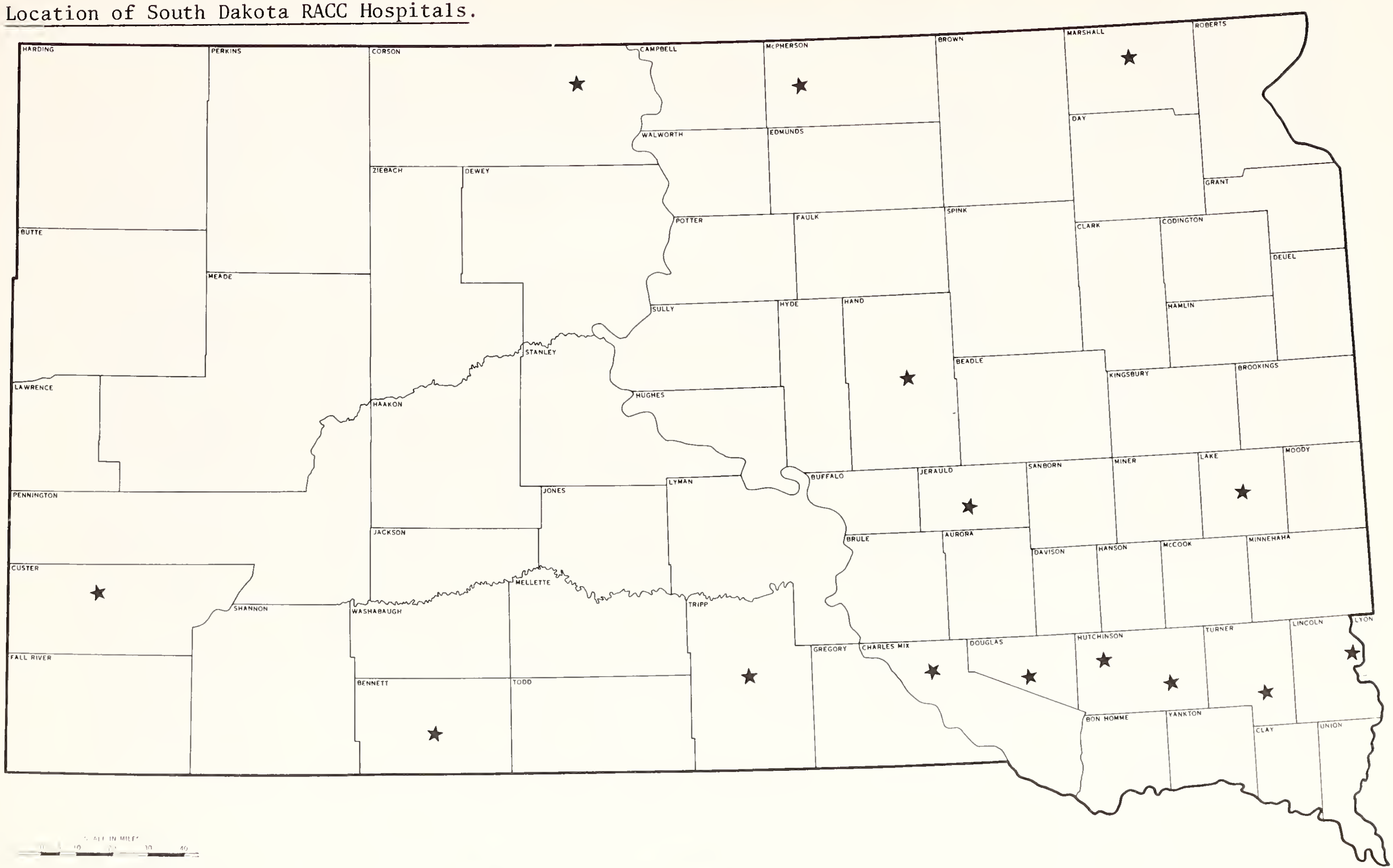


FIGURE II.3:

Location of South Dakota RACC Hospitals.



ting in the swing-bed experiments with all other rural community hospitals in Texas, western Iowa/South Dakota, and central Iowa.[8]

Significant differences in hospital size and utilization patterns exist between the project hospitals and other rural hospitals in each of the three swing-bed projects. Swing-bed hospitals have fewer beds, admissions, inpatient days, and lower occupancy rates than non-project hospitals. These differences reflect the hospital eligibility criteria (discussed in the preceding section) which were used to determine which hospitals could participate in the experimental programs.

Differences in staffing patterns also exist between project and non-project hospitals. In all three projects, there are significantly fewer total hospital employees per bed in the project hospitals than in the non-project hospitals.[9] The number of RNs per bed in project hospitals is significantly lower only for the western Iowa/South Dakota project. The number of LPNs per bed is significantly lower in both the western Iowa/South Dakota and central Iowa projects. These lower staffing ratios are likely due, in part, to the lower occupancy rates in the project hospitals.

In the area of specialized services available, there are few significant differences between project and non-project hospitals. Across the three swing-bed projects, a relatively low percentage of hospitals (if any) in each group provide the specialized services listed in the table. These services are not normally provided by rural hospitals; and thus, this finding was not unanticipated. As the figures in the table indicate, however, a lower percentage of the project hospitals than the non-project hospitals provide such services as rehabilitation, physical therapy, occupational therapy, social work, and speech therapy, which are important SNF services. This suggests that hospitals with less available long-term care services participated in the experiments. The project hospitals therefore appear to be more oriented toward acute care patients requiring fewer specialized services overall and less equipped to deal with patients who require more complex treatment and specialized services. The differences between the services provided by the project and non-project hospitals, as well as the implications for the quality of care provided to swing-bed patients, are covered in more detail in Chapter V.

In summary, the experimental swing-bed hospitals are not typical of other rural hospitals in their respective states. They tend to be

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[8] Rural is defined to mean location in a non-SMSA county. A community hospital is defined as a short-term, non-federal general hospital which is open to the public.

[9] Total employees include all personnel, both professional and hospital support personnel.

TABLE II.1:

A Comparison of Project and Non-Project Hospitals on Selected Hospital Characteristics for 1975[1]

Hospital Characteristics	Texas			Western Iowa/South Dakota			Central Iowa		
	Project Hospital Mean (N=39)	Non-Project Hospital Mean (N=214)	Signif. Level[2]	Project Hospital Mean (N=21)	Non-Project Hospital Mean (N=67)	Signif. Level[2]	Project Hospital Mean (N=22)	Non-Project Hospital (N=59)	Signif. Level[2]
Total hospital beds	38.5	52.1	.001	37.1	65.3	.001	61.6	115.1	.039
Total admissions	1070.7	1816.6	<.001	865.2	2068.0	<.001	1562.5	3645.1	.014
Total inpatient days	6623.0	11350.2	<.001	6179.0	14458.7	<.001	11898.5	28070.5	.017
Total occupancy rate	44.5	55.9	<.001	41.6	55.0	.003	50.2	62.7	.004
Staffing									
RNS per bed	.190	.209	.135	.232	.322	<.001	.290	.323	.236
LPNs per bed	.263	.280	.481	.068	.148	<.001	.099	.150	.014
Total employees per bed	1.466	1.734	<.001	1.198	1.680	<.001	1.441	1.765	.001
Specialized services[3] (expressed as a percentage)									
Extended care unit	0.0%	0.5%	.846	9.5%	13.4%	.483	22.7%	23.7%	.500
Intensive care unit	35.9	49.1	.089	47.6	71.6	.041	68.2	76.3	.206
X-Ray	10.3	9.8	.560	4.8	19.4	.098	9.1	28.8	.004
Emergency department	71.8	45.6	.002	85.7	86.6	.586	90.9	94.9	.358
Rehabilitation	0.0	0.0	1.000	0.0	1.5	.761	4.6	1.7	.309
Physical therapy	23.1	36.9	.066	38.1	58.2	.087	72.7	89.8	.016
Occupational therapy	0.0	0.5	.846	0.0	3.0	.578	4.6	10.2	.245
Social work	0.0	5.1	.152	9.5	26.9	.082	13.6	44.1	.001
Dental services	5.1	6.5	.540	9.5	26.9	.082	18.2	39.0	.012
Speech therapy	0.0	0.9	.715	0.0	6.0	.329	4.6	22.0	.007

[1]Non-project hospitals are rural community hospitals in Texas, Iowa and South Dakota which did not participate in the swing-bed experiments.

[2]Value is the exact p-value or significance level, associated with the two-sample t-test for mean differences or Fisher's Exact Test for the difference between two proportions (Fisher's test was used for the last ten hospital characteristics).

[3]Figures give the average percent of hospitals which provide a particular service or facility.

Source: American Hospital Association Hospital Survey (1975)

smaller, have lower utilization, fewer staff, and offer fewer specialized services than other rural hospitals. Program specific factors such as hospital selection criteria and the limited number of hospitals in the experiments, as well as voluntary incentives to participate in the swing-bed projects, appear to determine the observed differences in project and non-project hospital characteristics. It is assumed that these factors will be different if the program is implemented nationally.

CHAPTER III

ORGANIZATION

A. INTRODUCTION

The purpose of the organizational component of the evaluation is to describe the operation of the swing-bed experiments at the hospital level and to determine whether a national swing-bed program can be implemented and achieve acceptance by hospital staff and nursing home administrators. This chapter is descriptive in nature, with primary emphasis on discussing and assessing the operation of the swing-bed experiments, as reported by hospital staff members in the participating hospitals. Information provided by nursing home administrators is used in the analysis dealing with implementation of a national swing-bed program.

Section B provides an overview of the organizational component. Section C presents the methods used, including data sources and analyses performed. Findings are contained in Section D, and Section E presents recommendations on implementation of a national swing-bed program.

B. OVERVIEW

The organizational findings are divided into three analytic areas: (1) acceptance of the swing-bed experiments by hospital staff; (2) acceptance of a national swing-bed program by nursing home administrators; and (3) benefits, problems, and suggestions related to swing-bed care.

In the first analytic area, acceptance of the swing-bed experiment was operationalized as the desire of hospital staff to have the experiment continued in their hospitals. Four general features of the experimental hospitals were examined separately and then used to explain hospital staff acceptance: (1) reasons hospital administrators elected to join the swing-bed experiment; (2) provision of long-term care in participating hospitals prior to the experiment; (3) interaction with the staff of the administering agency; and (4) services, staffing, and training in participating hospitals.

In the second analytic area, acceptance of a national swing-bed program by nursing home administrators was defined as a preference to have a national swing-bed program implemented. Acceptance by nursing home administrators was assessed with respect to three categories of variables: (1) facility characteristics; (2) the administrator's perception of the need for more long-term care in the county of the facility; and (3) the perceived effect of the experiment on nursing home utilization.

Benefits and problems associated with the provision of swing-bed care were examined in the third analytic area to determine the extent to which various benefits and problems might be typical of swing-bed care in general, as opposed to project specific. Suggestions made by hospital administrators and nursing home administrators form the basis for recommendations on implementation of a national swing-bed program.

C. METHODS

1. Data Sources

Project hospitals are defined throughout this study as those hospitals whose administrators signed a formal agreement with SSA to participate in the swing-bed experiments. As indicated in Chapter II, 83 hospital administrators initially agreed to participate, but one hospital in South Dakota closed and was therefore excluded from the analyses. Of the remaining 82 hospitals, 39 are in the RACC experiment in Texas, 21 in the RACC experiment in western Iowa/South Dakota, and 22 in the central Iowa project.

Data sources used in the organizational evaluation are listed in Table III.1. All surveys were pretested and subjected to several stages of item analysis before final refinement. The Provider Survey was administered by phone in the spring of 1978 by evaluation staff members to hospital administrators, directors of nursing, and chiefs of staff of the 82 project hospitals. These individuals were chosen because they had administrative responsibilities in the participating hospitals and were therefore most likely to have had experience with the swing-bed experiment. Also, they were the focus of orientation and education efforts by the project staff and were in a position to receive feedback from the staff of their own hospitals regarding the benefits and problems of providing long-term care in an acute care setting. Some questions were asked of more than one type of respondent, while others were directed only to the staff member regarded as most knowledgeable in the particular area.

Because staff physicians were responsible for the admission of long-term care patients to the hospitals and were therefore likely to have a greater impact on the utilization of the swing-bed projects than other hospital staff, a separate Staff Physician Survey was mailed to a sample of staff physicians in late 1978. Names of physicians were obtained from chiefs of staff as part of the Provider Survey and were subsequently verified with hospital administrators. In hospitals with three or fewer staff physicians, all physicians were surveyed; three physicians were selected randomly from hospitals with more than three physicians.

The Follow-Up Provider Survey and the Nursing Home Administrator Survey were mailed in the Spring of 1979. The Follow-Up Survey was sent to all 82 administrators of participating hospitals and the Nursing Home Administrator Survey was sent to 421 (23.5%) of the 1,789 adminis-

TABLE III.1:

Data Sources Used in the Organizational Analysis.

Data Source	Year	Data Obtained and Sample
Provider Survey[1]	1976-1978	Data Obtained: Hospital characteristics, project operating characteristics, acceptance of the project. Samples: Hospital administrators, directors of nursing, and chiefs of staff of swing-bed hospitals (N=82 for each sample).
Staff Physician Survey[1]	1976-1978	Data Obtained: Project operating characteristics, acceptance of the project. Sample: Staff physicians (N=179).
Follow-Up Provider Survey[1]	1976-1979	Data Obtained: Suggestions for a national swing-bed program, hospital characteristics. Sample: Administrators of swing-bed hospitals (N=82).
Nursing Home Administrator Survey[1]	1976-1979	Data Obtained: Facility characteristics, project operating characteristics, acceptance of the project. Sample: Nursing home administrators in project states (N=421).
Medicare Cost Reports[1]	1976-1978	Data Obtained: Utilization data for swing-bed patients. Sample: Swing-bed hospitals (N=82).
American Hospital Association (AHA) Hospital Survey[2]	1977	Data Obtained: Nurse staffing. Sample: Swing-bed hospitals (N=82).

[1]Copies of data collection instruments are in the Data Forms Supplement.

[2]Publication is listed in the References.

trators of nursing homes located in the three project states. The nursing home administrator sample was stratified to equalize the number of nursing homes from project and non-project counties in each state, and to select relatively fewer personal care homes.[1]

Medicare Cost Reports, which are the principal data source for the financial analysis (and are described in Chapter VI, Section D.1), were used to determine which of the participating hospitals had admitted swing-bed patients. The American Hospital Association Survey was the source of data on nurse staffing and is described in Chapter IV, Section C.1.

2. Response to Surveys

The use of survey data raises the question of whether respondents to the surveys are representative of the populations surveyed. Since response rates to the Provider Survey for hospital administrators, directors of nursing, and chiefs of staff ranged from 95% to 99% (as shown in Table III.2), a comparison of respondents to non-respondents was not necessary. However, the response rates to the Staff Physician Survey (53%), the Follow-Up Provider Survey (80%), and the Nursing Home Administrator Survey (38%) were sufficiently low to warrant a comparison of respondents and non-respondents.

Two variables were chosen to compare physician respondents and non-respondents to the Staff Physician Survey as a check for potential sources of bias due to self-selection. First, the response rates for hospitals which had admitted swing-bed patients were compared to the response rates for non-admitting hospitals.[2] As shown in Table III.3, the proportion of staff physicians who responded to the Staff Physician Survey was not significantly different in admitting versus non-admitting hospitals ($p=.321$). Second, using the assumption that the opinions of staff physicians and the chief of staff would be the same regarding the swing-bed program, if no response bias to the Staff Physician Survey were present, it could be expected that the percentage of physicians favoring the experiment would be the same for both the Staff Physician Survey and the chief of staff portion of the Provider Survey.[3] However, approximately 87% of the staff physicians who responded to the Staff Physician Survey wanted the

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[1]The sampling design called for 480 nursing homes (160 from each state) with 80 of the nursing homes in each state to come from project counties and 80 from non-project counties. However, there were only 21 nursing homes located in all the project counties combined in South Dakota, thereby reducing the South Dakota sample to 101 and the total sample to 421.

[2]Hospitals which admitted swing-bed patients in either 1976, 1977, or 1978 were defined as admitting hospitals.

[3]Differences in the response rates to the two surveys are probably due to the fact that the Provider Survey for chiefs of staff was administered by phone and the Staff Physician Survey was administered by mail.

experiment continued in their hospitals, whereas significantly fewer, 73%, of the chiefs of staff who answered the Provider Survey wanted the experiment continued in their hospitals.[4] Hence, the findings on staff physicians should be interpreted with the knowledge that staff physicians who were favorable toward the experiment may have been more likely to respond to the survey than those who were unfavorable.

Table III.3 also indicates that the proportion of administrators from admitting hospitals who responded to the Follow-Up Provider Survey was not significantly different from the proportion of administrators from non-admitting hospitals who responded (p=.247). Using data available from the initial Provider Survey on whether administrators wanted their hospitals to continue, Table III.3 shows that administrators who were initially favorable toward the experiment were somewhat more likely to respond to the follow-up survey than administrators who were initially unfavorable (p=.089).

Two variables were chosen to compare respondents and non-respondents to the Nursing Home Administrator Survey. As shown in Table III.3, administrators of nursing homes located in project counties were not

TABLE III.2:

Response Rates for Surveys Conducted for the Organizational Component of the Evaluation.

Survey	Number of Individuals Surveyed	Number of Respondents	Response Rate (%)
Provider Survey:			
Hospital Administrators	82	81	99
Directors of Nursing	82	81	99
Chiefs of Staff	82	78	95
Staff Physician Survey	179	95	53
Follow-Up Provider Survey	82	66	80
Nursing Home Administrator Survey	421	161	38

[4]Using Fisher's Exact Test, p=.028. This value is not shown in Table III.3.

TABLE III.3:

Characteristics of Respondents and Non-Respondents to Surveys Conducted for the Organizational Evaluation.

	Respondents		Non-respondents		Total		Signif. Level[1]
	N	%	N	%	N	%	
Staff Physician Survey							
Admitting hospital medical staff	74	54.4	62	45.6	136	100.0	.321
Non-admitting hospital medical staff	21	48.8	22	51.2	43	100.0	
Follow-Up Provider Survey							
Admitting hospital administrator	52	83.9	10	16.1	62	100.0	.247
Non-admitting hospital administrator	14	70.0	6	30.0	20	100.0	
Administrator wants to continue in project	50	87.7	7	12.3	57	100.0	.089
Administrator does not want to continue in project	15	71.4	6	28.6	21	100.0	
Nursing Home Administrator Survey							
Project county nursing home	69	37.3	116	62.7	185	100.0	.435
Non-project county nursing home	91	38.6	145	61.4	236	100.0	
Home provides nursing care	151	40.1	226	59.9	377	100.0	.007
Home provides only personal care	9	20.5	35	79.5	44	100.0	

[1]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Sources: Medicare Cost Reports, Provider Survey for Hospital Administrators, state departments of health

more likely to answer the survey than administrators of nursing homes in non-project counties (p=.435). However, administrators of nursing homes providing nursing care were more likely to answer the survey than administrators of nursing homes providing only personal care (p=.007).[5]

In summary, there was no significant difference in the proportions of staff physicians and hospital administrators from admitting versus nonadmitting hospitals who responded to the various surveys. However, staff physicians who were favorable to the experiment may have been more likely to respond to the survey than those who were unfavorable. Similarly, administrators who favored the experiment were more likely to respond than those who did not. There was no significant difference in the response rates of administrators of nursing homes located in project versus non-project counties, but administrators of facilities providing nursing care were more likely to respond than administrators of facilities providing only personal care. A final topic related to survey response rates is the response rate to each individual item on the surveys. While the figures in Table III.2 indicate the total number of respondents to each survey, it is important to note that each respondent did not always provide information on all items. For this reason, frequencies associated with several findings presented in Section C differ from those given in Table III.2.

3. Variables and Analytic Methods

The variables included in the organizational evaluation are presented in Table III.4, and are grouped according to the three analytic areas discussed in Section B. The first analytic area, hospital staff acceptance, deals with the variation across projects in terms of the desire of hospital staff to have the experiment continued on a permanent basis in their hospital. Differences in the reasons hospital administrators agreed to participate; prior experience of the hospitals with long-term care; interaction with project staff; and services, staffing, and training in the participating hospitals were examined across the three projects. Information in these four areas was then related to hospital staff acceptance to determine which factors explain why some staff members wanted the experiment continued while others did not.

To determine the extent to which the variables in the four groups were related to acceptance for each type of hospital staff member, a multivariate logistic regression procedure was used (Jones 1975). This technique was employed in place of discriminant analysis because the inclusion of dichotomous independent variables in a discriminant analysis violates the assumption that all independent variables are nor-

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[5]Facilities providing nursing care include all facilities providing skilled and/or intermediate care. Personal care facilities are those providing personal care only. Facilities providing both nursing care and personal care are classified as nursing care facilities.

TABLE III.4:

Variables Used in the Organizational Analysis by Analytic Area.

HOSPITAL STAFF ACCEPTANCE

Reasons for participating in the swing-bed project
- Increase hospital occupancy
- Increase hospital revenue
- Meet a need for long-term care in the community
- More efficient use of staff
- More efficient use of space

Prior experience of swing-bed hospitals with long-term care
- Long-term care provided in a distinct part
- Long-term care provided under the Medicare special reimbursement provision
- Long-term care provided in acute care beds for private psy patients

Interaction with project staff
- Attendance at orientation conducted by project staff
- Information received from project staff
  - (1) On admission procedures
  - (2) On completion of monthly reports
  - (3) On filing Medicare claims

Services, staffing, and training
- Services provided
  - (1) Physical therapy
  - (2) Speech therapy
  - (3) Occupational therapy
  - (4) Social services
  - (5) Patient activities
- Staffing
  - (1) Nursing staff
  - (2) Medical staff
- Training for nurses
  - (1) Training in rehabilitative nursing
  - (2) Inservice training by project staff

Acceptance of the swing-bed projects
- Desire to have the hospital continue in the project

NURSING HOME ADMINISTRATOR ACCEPTANCE

Facility characteristics
- Occupancy
- Bed size
- Medicare certification
- Medicaid certification
- Skilled level care provided
- Intermediate level care provided
- Personal level care provided

Need for more long-term care
- Need for more skilled care in county
- Need for more intermediate care in county
- Need for more personal care in county

Effect of the experiment on nursing home utilization
- Experiment decreased nursing home utilization

Acceptance of a national swing-bed program
- Desire to have a national swing-bed program implemented

BENEFITS, PROBLEMS, AND SUGGESTIONS

Benefits and problems encountered in admitting hospitals[1]
- Benefits
  - (1) Increased hospital revenue (ADM)
  - (2) Increased hospital occupancy (ADM)
  - (3) More efficient use of nursing staff (ADM, DNS)
  - (4) More efficient use of space (ADM, DNS)
  - (5) Met a need for long-term care in the community (ALL)
  - (6) Better continuity of care (MD)
  - (7) Easier for physicians to see patients (MD)
- Problems
  - (1) Completion of reimbursement forms (ADM)
  - (2) Completion of reporting forms (ADM)
  - (3) Inadequate reimbursement to hospitals (ADM)
  - (4) Inadequate staffing (ADM, DNS, COS)
  - (5) Inadequate orientation (ALL)
  - (6) Inadequate technical assistance (ALL)
  - (7) Lack of appropriate services (ADM, DNS, COS)
  - (8) Lack of physical space (ADM, DNS, COS)
  - (9) Nurses reluctant to provide long-term care (ADM, DNS)
  - (10) Physicians reluctant to admit long-term care patients (ADM, DNS, COS)

Benefits and problems perceived by nursing home administrators
- Benefits
  - (1) Availability of hospital staff to provide care
  - (2) Financial help to hospitals
  - (3) Provides care when nursing home beds are unavailable
- Problems
  - (1) Insufficient staffing to provide care
  - (2) Higher costs to patients
  - (3) Hurts nursing homes financially
  - (4) Hospital not a "home-like" environment
  - (5) Quality of care

Suggestions for a national swing-bed program
- Entry requirements
  - (1) Hospitals in rural areas
  - (2) Hospitals without a skilled nursing care facility in service area
  - (3) Hospitals without an intermediate care facility in service area
- Levels of care
  - (1) Allow hospitals to provide skilled care
  - (2) Allow hospitals to provide intermediate care
  - (3) Allow hospitals to provide personal care
- Services
  - (1) Require hospitals to provide physical therapy
  - (2) Require hospitals to provide speech therapy
  - (3) Require hospitals to provide occupational therapy
  - (4) Require hospitals to provide social services
  - (5) Require hospitals to provide patient activities program

[1]Abbreviations in parentheses indicate the hospital staff member(s) supplying information on each benefit or problem. ADM indicates hospital administrators; DNS, directors of nursing; COS, chiefs of staff; MD, staff physicians; and ALL, all of the above.

mally distributed. For each group of hospital staff (administrators, directors of nursing, and chiefs of staff), the independent variables used in the logistic regression were those which were found to have statistically significant relationships with acceptance of the project. The dependent variable for all equations was acceptance of the swing-bed project.

A chi-square test was generally used to test for the significance of differences across projects. Since it requires that expected cell frequencies be greater than five, it was necessary to combine cells in some instances, as noted in the appropriate tables in this chapter. For many analyses, this resulted in the comparison of the "pooled" proportion resulting from combining data from the two most similar projects to that for the remaining project. Fisher's Exact Test was then used for testing the equality of the two proportions because its significance levels are always more accurate than those produced by the chi-square test for two proportions. One-way analysis of variance was used to examine differences in staffing across the three projects and t-tests were used to relate staffing to acceptance.

The variables used in the hospital staff acceptance analysis came primarily from the Provider Survey and the Staff Physician Survey.[6] Hospital administrators provided information on their reasons for joining the swing-bed experiment, prior experience of their hospitals with long-term care, and services available in their hospitals. Directors of nursing were asked about the training of nurses for the provision of long-term care and chiefs of staff were asked about medical staff. All respondents were asked about interaction with the staff of their administering agency and whether they wanted to have their hospitals continue in the experiment.

The nursing home administrator acceptance analysis, the second analytic area, focuses on the opinions of nursing home administrators about the implementation of a national swing-bed program. Facility characteristics, the administrator's perception of the need for more long-term care in the county in which the facility is located, and the perceived effect of the experiment on nursing home utilization were examined across the three projects. These factors were then related to nursing home administrators' acceptance of the swing-bed program to determine which factors explained why some nursing home administrators wanted a national swing-bed program implemented, while others did not. As in the previously described analysis, chi-square, Fisher's, one-way analysis of variance, and t-tests were used to test for statistically significant differences between groups of nursing homes. A multivariate logistic regression analysis, similar to that used to examine

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[6]Two variables came from other sources. Information on whether the hospital had provided long-term care in acute care beds prior to the experiment came from the Follow-Up Provider Survey and information on nurse staffing came from the American Hospital Association Survey.

factors related to hospital staff acceptance, was undertaken to determine the variables most closely related to nursing home administrator acceptance. All the variables described previously, with the exception of facility bed size and the two certification variables, were included as independent variables. Nursing home administrator acceptance of the swing-bed project was the dependent variable. All variables used in the nursing home administrator acceptance analysis are presented in Table III.4 and were obtained from the Nursing Home Administrator Survey.

The third analytic area, benefits, problems, and suggestions, has a dual focus. First, benefits and problems encountered by the staffs of admitting hospitals were compared by project, as were benefits and problems perceived by administrators of nursing homes located in the project states, using chi-square and Fisher's tests. The purpose of this comparison was to determine whether the benefits and problems encountered are representative of swing-bed care in general or whether they suggest factors which are peculiar to a specific project (or projects). Second, suggestions made by hospital and nursing home administrators for a national swing-bed program were compared to determine whether suggestions were based on specific experience with swing-bed care or experience with long-term care in general. Statistical procedures similar to those used in the first two analytic areas were also employed here.

Benefits and problems encountered in admitting hospitals were discussed with hospital administrators, directors of nursing, and chiefs of staff as part of the Provider Survey, and with staff physicians as part of the Staff Physician Survey. Structured questions were developed from data gathered for the Utah swing-bed evaluation.[7] Questions were directed toward those individuals judged to be most knowledgeable about the benefit or problem of concern. If more than one staff member had experience within a given area, questions were asked of all staff members concerned with that area. The hospital staff members providing information on each benefit and problem encountered in admitting hospitals are indicated in Table III.4.

Open-ended questions were used on the Nursing Home Administrator Survey to obtain information on benefits and problems. Structured questions were not used because they would have greatly increased the length of the survey. Since the Nursing Home Administrator Survey was a mail survey, it was felt that the increased length might discourage some nursing home administrators from responding.

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[7]Each series of questions on benefits or problems was followed by an open-ended question asking if additional benefits or problems had been encountered. Analysis of these open-ended questions indicated that the major benefits and problems had been covered by the structured questions. For a discussion of the Utah swing-bed evaluation, see Shaughnessy et al. (1978b).

Suggestions for a national swing-bed program were obtained using structured questions for both hospital and nursing home administrators. Both groups of respondents were asked about entry requirements for determining which hospitals should be allowed to participate in a national swing-bed program, levels of care which should be allowed, and services which hospitals should be required to provide to swing-bed patients.

D. FINDINGS

The findings of the organizational component are grouped into the three analytic areas discussed previously. For each area, findings are discussed for the three projects combined to provide an overall picture of how the projects operated, and by individual projects in order to highlight differences across the three experiments.

Although the .05 and .01 significance levels are commonly used as the appropriate significance levels in many fields of research, policy decisions must often be made on the basis of results which are likely to be true with lower probability. Therefore, the .10 level of significance was chosen for this study; exact significance levels, however, are presented for the reader who wishes to apply a different level of significance.

1. Hospital Staff Acceptance

a. Reasons for Participating in the Swing-Bed Experiments: Since participation in the swing-bed experiments was voluntary, the reasons hospital administrators agreed to participate in the experiment can be considered indicative of the reasons administrators would participate in a national swing-bed program. As shown in Table III.5, joining in order to increase hospital occupancy, to meet a need for long-term care in their communities, and to use space more efficiently, were each mentioned by over 90% of the hospital administrators in the experimental programs. Over 80% joined in order to use staff more efficiently and slightly less than 70% joined in order to increase revenue.

A significantly larger proportion of Iowa and South Dakota hospitals than Texas hospitals joined in order to increase hospital revenue and meet a need for long-term care in the community. In addition, a larger proportion of administrators in central Iowa than in the other two projects joined to use physical space more efficiently.

b. Prior Experience of Swing-Bed Hospitals with Long-Term Care: Overall, relatively few of the hospitals participating in the swing-bed projects had extensive experience with long-term care prior to the swing-bed experiment. Table III.6 indicates that although 41% of the hospitals had some experience with long-term care, less than 30% of the participating hospitals had provided long-term care under the Medicare special provision or in acute care beds to private pay patients, and only 21% had operated (and in some cases continued to

TABLE III.5:

Frequency and Percentage Distribution of Hospital Administrators by Reasons for Participating in the Swing-Bed Experiments and Project.

Reasons for Participating in the Swing-Bed Experiment	Frequency and Percentage of Hospital Administrators[1]								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif. Level
	N	%	N	%	N	%	N	%	
Increase hospital revenue	18	52.9	17	85.0	16	76.2	51	68.0	.032[2]
Increase hospital occupancy	33	91.7	19	95.0	19	90.5	71	92.2	.506[3]
Meet a need for long-term care in the community	29	85.3	19	95.0	21	100.0	69	92.0	.063[3]
More efficient use of staff	28	80.0	16	80.0	20	90.4	64	83.1	.211[3]
More efficient use of space	30	85.7	18	90.0	22	100.0	70	90.9	.084[3]

[1]The number of reasons do not sum to the total number of respondents because administrators could indicate more than one reason. Percentages for the first and third reasons are based on 75 cases and the second, fourth, and fifth reasons are based on 77 cases.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

[3]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Source: Provider Survey for Hospital Administrators

operate) a distinct-part long-term care unit prior to the project.[8]

Comparisons across projects indicate that a significantly higher proportion of Iowa and South Dakota hospitals than Texas hospitals had some experience with the provision of long-term care. Specifically, a larger proportion of South Dakota and Iowa hospitals had operated

TABLE III.6:

Frequency and Percentage Distribution of Swing-Bed Hospitals by Type of Prior Long-Term Care Experience and Project.

Type of Prior Long-Term Care Experience	Frequency and Percentage of Swing-Bed Hospitals[1]								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif. Level[2]
	N	%	N	%	N	%	N	%	
In a distinct part	2	5.3	6	28.6	9	40.9	17	21.0	.003
Under Medicare special provision	6	16.7	6	31.6	10	45.5	22	28.6	.059
In acute care beds for private pay patients	5	20.8	8	42.1	5	25.0	18	28.6	.282
Experience of one or more of the above types	7	18.4	14	66.7	12	54.5	33	40.7	<.001

[1]Percentages are based on 81, 77, 63, and 81 cases on which data were available, respectively.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

Sources: Provider Survey and Follow-Up Provider Survey

[8]The Medicare special provision, which allows hospitals to be reimbursed at acute care rates for long-term care when certified long-term care beds are unavailable, is described in Chapter I, Section B.

a distinct part or had provided long-term care under the Medicare special provision. Comparisons within projects indicate that the most common type of long-term care provided prior to the swing-bed experiments in Texas and western Iowa/South Dakota hospitals was long-term care in acute care beds for private pay patients, whereas the most common type in central Iowa hospitals was long-term care under the Medicare special provision.

c. Interaction with Project Staff: More hospital administrators attended orientation conducted by the project staff than directors of nursing, who in turn had higher attendance than chiefs of staff and staff physicians, as shown in Table III.7. Comparisons by project indicate that the proportions of hospital administrators, chiefs of staff, and staff physicians attending orientation were very similar in western Iowa/South Dakota and central Iowa, but the proportion of directors of nursing attending orientation in central Iowa was substantially higher

TABLE III.7:

Frequency and Percentage Distribution of Hospital Staff Attending Orientation by Staff Position and Project.

	Frequency and Percentage of Hospital Staff[1]								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif.
Staff Position	N	%	N	%	N	%	N	%	Level[2]
Hospital administrators	25	65.8	18	85.7	20	90.0	63	77.8	.047
Directors of nursing	13	34.2	12	57.1	20	90.9	45	55.6	.001
Chiefs of staff	3	8.3	8	38.1	8	38.1	19	24.4	.009
Staff physicians	3	10.3	11	42.3	14	37.8	28	30.4	.016

[1]A total of 81 hospital administrators, 81 directors of nursing, 78 chiefs of staff, and 92 staff physicians responded to the survey question on orientation.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

Source: Provider Survey and Staff Physician Survey

than in western Iowa/South Dakota. The most noteworthy difference between projects was the significantly lower proportion of Texas hospital staff of each type attending orientation than the corresponding proportions for western Iowa/South Dakota and central Iowa.

Table III.8 shows that approximately 90% of the hospital administrators reported receiving information on the procedures necessary to (1) admit swing-bed patients, (2) complete monthly utilization reports which were sent to the project staff as part of the experiment, and (3) file Medicare claims. Fewer administrators of Texas hospitals reported receiving information on admission procedures than in Iowa and South Dakota. No significant differences were found between the

TABLE III.8:

Frequency and Percentage Distribution of Swing-Bed Hospital Administrators Receiving Information from Project Administrative Staff by Type of Information Received and Project.

	Frequency and Percentage of Hospital Administrators Receiving Information from Project Administrative Staff[1]								
Type of Information Received	Texas N	Texas %	Western Iowa/ South Dakota N	Western Iowa/ South Dakota %	Central Iowa N	Central Iowa %	Total N	Total %	Signif. Level[2]
Information on admission procedures	31	86.1	20	95.2	21	95.5	75	91.1	.019
Information on completion of monthly reports	30	83.3	19	90.5	20	90.9	69	87.3	.260
Information on filing Medicare claims	32	88.9	20	95.2	21	95.5	73	92.4	.257

[1]Percentages for all three questions are based on responses from 79 hospital administrators.

[2]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Source: Provider Survey for Hospital Administrators

projects in the proportion of administrators who reported receiving information on how to complete monthly reports or file Medicare claims.

d. Services, Staffing, and Training in Participating Hospitals: The availability of services commonly needed by long-term care patients varied according to type of service, as indicated in Table III.9. The most frequently available services were physical therapy and social services; relatively few hospitals provided speech therapy, patient activities, or occupational therapy. In addition, a significantly higher proportion of the hospitals which operated distinct-part long-term care units provided each of the five key services than did hospitals without a separate unit. Of the hospitals operating long-term care units, 90% provided patient activities, 80% provided physical therapy and social services, 70% provided speech therapy, and 30% provided occupational therapy.

TABLE III.9:

Frequency and Percentage Distribution of Swing-Bed Hospitals by Availability of Five Key Long-Term Care Services and Project.

Key Long-Term Care Services	Frequency and Percentage of Swing-Bed Hospitals[1]								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif. Level
	N	%	N	%	N	%	N	%	
Physical therapy	15	39.5	10	47.6	18	81.8	43	53.1	.005[2]
Speech therapy	1	2.6	1	4.8	12	54.5	14	17.3	<.001[3]
Occupational therapy	1	2.6	0	0.0	3	13.6	4	4.9	.059[3]
Social services	10	26.3	4	19.0	15	68.2	29	35.8	.001[2]
Patient activities	3	7.9	4	19.0	6	27.3	13	16.0	.093[3]

[1]Percentages are based on data from 81 hospitals.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

[3]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Source: Provider Survey for Hospital Administrators

Comparisons across projects indicate that a significantly larger number of central Iowa hospitals offered each of the five long-term care services than did hospitals in the other two projects. This is in keeping with the findings reported earlier that central Iowa hospitals had significantly more formal experience with long-term care prior to the experiments than did hospitals in Texas and western Iowa/South Dakota, and that such experience is related to the provision of key long-term care services.

Nurse and medical staffing statistics are presented in Table III.10 and represent the number of each type of staff per 100 beds, computed using all hospitals for which data were available. Although the number of registered nurses was higher overall than the number of licensed practical nurses, comparisons across projects indicate that Texas hospitals had significantly fewer registered nurses and more licensed

TABLE III.10:

Nursing and Physician Staff per 100 Beds in Swing-Bed Hospitals by Project.

	Texas	Western Iowa/ South Dakota	Central Iowa	Total	Signif. Level[1]
FTE RNs per 100 Beds					
Mean	19.12	27.66	29.55	24.11	<.001
St. Dev.	6.60	7.90	11.78	9.75	
No. of hospitals	39	21	22	82	
FTE LPNs per 100 Beds					
Mean	25.27	8.36	10.16	16.89	<.001
St. Dev.	13.15	6.89	7.61	13.15	
No. of hospitals	39	21	22	82	
Staff Physicians per 100 Beds					
Mean	11.04	11.75	10.98	11.22	.898
St. Dev.	5.76	7.70	5.20	6.15	
No. of hospitals	36	21	20	77	

[1]Value is the exact p-value, or significance level, for the F-test associated with analysis of variance.

Sources: AHA Hospital Survey for 1977 and Provider Survey for Chiefs of Staff

practical nurses than hospitals in Iowa and South Dakota. No significant differences were found across projects in physician staffing.

In order to consider the effects of facility occupancy rates on staffing, an additional analysis was conducted using staffing figures per 100 occupied beds. Staffing levels by occupancy were at least two times the levels presented in Table III.10. The projects averaged 56 RNs, 38 LPNs, and 27 staff physicians per 100 occupied beds. Although the total staffing levels differed considerably, the relationships across projects are similar to those reported previously.

Data on nursing staff training (not presented in tabular form) for long-term care indicate that nurses in 28.4% of the participating hospitals had training in rehabilitative nursing and nurses in 52.6% of the 76 hospitals on which data were available had received inservice training from the project staff. A larger proportion (57.1%) of western Iowa/South Dakota hospitals had nurses with training in rehabilitative nursing than did central Iowa (27.3%) and Texas (13.2%) hospitals. Proportions were reversed, however, for the number of hospitals whose nurses received inservice training by the project staff. Texas had the largest proportion of hospitals (64.7%) whose nurses received inservice training, followed by central Iowa (59.1%) and western Iowa/South Dakota hospitals (25.0%).[9] Thus, while the manner in which nursing staff training was acquired varied, the projects appear to be roughly comparable in terms of the percentages of trained nurses, although the extent and quality of the training may have varied.

e. Acceptance of the Swing-Bed Experiment in Participating Hospitals: Acceptance of the swing-bed experiment was relatively high for all four types of hospital staff surveyed. As shown in Table III.11, over 70% of the hospital administrators and chiefs of staff and over 80% of the directors of nursing and staff physicians who responded to the question on acceptance wanted the experiment continued.[10] These responses were gathered approximately one year after the experiments had begun. The central Iowa project had the highest acceptance among hospital staff, closely followed by the western Iowa/South Dakota project; the Texas project had the lowest level of acceptance. These differences were statistically significant for all four types of staff surveyed.

As discussed in Sections 1.a through 1.d above, there was variation across projects in the reasons why hospital administrators agreed to participate in the swing-bed experiment, prior experience of participating hospitals with long-term care, interaction between project staff

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[9]The exact p-values, or significance levels, associated with the chi-square test for the equality of proportions across the three projects were .002 for training in rehabilitative nursing and .014 for inservice training by project staff.

[10]As discussed in Section C.2, staff physicians who were favorable toward the experiment may have been more likely to respond to the survey than those who were unfavorable.

and hospital staff, and services, staffing, and training in participating hospitals. The purpose of the analysis in this section is to determine the extent to which these factors explain the variation in acceptance by hospital administrators, directors of nursing, and chiefs of staff.

(1) Acceptance and Reasons for Participation: As discussed earlier, the five most frequent reasons hospital administrators gave for participating in the swing-bed experiment were to increase hospital revenue, increase hospital occupancy, to meet a need for long-term care in the community, to use hospital staff more efficiently, and to use physical space more efficiently. Examination of the relationship between each of these reasons and the administrator's desire to

TABLE III.11:

Frequency and Percentage Distribution of Hospital Staff Wanting to Continue in the Swing-Bed Experiments by Staff Position and Project.

	Frequency and Percentage of Hospital Staff Wanting to Continue in the Swing-Bed Experiments[1]								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif.
Staff Position	N	%	N	%	N	%	N	%	Level
Hospital administrators	16	45.7	19	90.5	22	100.0	57	73.1	<.001[2]
Directors of nursing	20	64.5	17	89.5	21	95.5	58	80.6	.003[3]
Chiefs of staff	18	58.1	16	76.2	18	94.7	52	73.2	.016[2]
Staff physicians	6	50.0	20	90.9	36	97.3	62	87.3	<.001[3]

[1]Seventy-eight administrators, 72 directors of nursing, 71 chiefs of staff, and 71 staff physicians answered this question.

[2]Values are the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

[3]Values are the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Sources: Provider Survey and Staff Physician Survey

continue in the experiment indicates that more administrators who joined in order to meet a community need or to utilize staff more efficiently wanted to continue. Fifty-three (79.1%) of the 67 hospital administrators who joined in order to meet a community need wanted to continue in the experiment, compared to 2 (33.3%) of the 6 hospital administrators who did not join in order to meet a community need (p=.029). Fifty-one (87.3%) of the 62 hospital administrators who joined in order to utilize staff more efficiently wanted to continue in the experiment, compared to 5 (38.5%) of the 13 administrators who did not give efficient use of staff as a reason for joining (p=.002).[11] There were no statistically significant relationships between a desire to continue in the swing-bed program and the remaining three reasons given for participation.

(2) Acceptance and Prior Long-Term Care Experience: The three variables measuring prior experience of swing-bed hospitals with long-term care indicate whether long-term care was provided in a distinct part, under the Medicare special provision, and/or provided in acute care beds for private pay patients. As shown in Table III.12, two of the variables measuring prior experience with long-term care in swing-bed hospitals were significantly related to acceptance by hospital administrators, and one was related to acceptance by directors of nursing. More administrators from hospitals which operated a distinct part prior to the project wanted to continue in the experiment and more administrators and directors of nursing from hospitals which had provided long-term care under the Medicare special provision wanted to continue. None of the prior experience variables were significantly related to the desire of chiefs of staff to have the experiment continued.

(3) Acceptance and Interaction with Project Staff: The relationship between attendance at orientation and acceptance of the project was examined for hospital administrators, directors of nursing, and chiefs of staff. As shown in Table III.12, a significantly greater number of hospital administrators and directors of nursing who attended orientation wanted to continue in the experiment; there was no significant relationship between attendance at orientation and acceptance by chiefs of staff. Associations between the three information variables and acceptance were examined only for hospital administrators, since they were the objects of the information sent by administering agencies, and the results are not presented in Table III.12. None of these variables, information received from project staff on admission procedures, completion of monthly reports, or filing Medicare claims, were significantly related to acceptance of the project by hospital administrators.[12]

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[11] Reasons for participating were applicable only to acceptance by hospital administrators and thus are not presented in tabular form. P-values are for Fisher's Exact Test.

[12] The significance levels were .279, .540, and .193, respectively, using Fisher's Exact Test.

TABLE III.12:

Frequency and Percentage Distribution of Hospital Staff Wanting to Continue in the Swing-Bed Experiment by Prior Experience of Hospitals with Long-Term Care, Interaction with Project Staff, Services Provided, Nurse Training, and Staff Position.

		Frequency and Percentage of Hospital Staff Wanting to Continue in the Swing-Bed Experiment								
		Hospital Administrators			Directors of Nursing			Chiefs of Staff		
		N	%	Sig.[1]	N	%	Sig.[1]	N	%	Sig.[1]
Prior Experience with Long-Term Care										
In distinct part	Yes	15	88.2	.095	15	88.2	.297	13	81.3	.316
	No	42	68.9		43	78.2		39	70.9	
Under Medicare special provision	Yes	20	90.9	.031	18	94.7	.074	17	81.0	.458
	No	36	67.9		39	76.5		35	76.1	
In acute care beds for private pay patients	Yes	15	88.2	.141	16	94.1	.216	15	88.2	.160
	No	32	71.1		31	81.6		28	71.8	
Interaction with Project Staff										
Attendance at orientation	Yes	48	77.4	.086	39	90.7	.010	15	83.3	.212
	No	9	56.3		19	65.5		37	69.8	
Services Provided										
Physical therapy	Yes	33	78.6	.177	33	80.5	.614	31	81.6	.076
	No	24	66.7		25	80.6		21	63.6	
Speech therapy	Yes	13	100.0	.011	14	100.0	.034	11	91.7	.106
	No	44	67.7		44	75.9		41	69.5	
Occupational therapy	Yes	3	75.0	.708	3	75.0	.588	3	100.0	.387
	No	54	73.0		55	80.9		49	72.1	
Social services	Yes	24	85.7	.050	25	89.3	.116	22	84.6	.083
	No	33	66.0		33	75.0		30	66.7	
Patient activities	Yes	12	92.3	.078	12	92.3	.221	10	90.9	.141
	No	45	69.2		46	78.0		42	70.0	
Nurse Training										
Rehabilitative nursing	Yes	20	87.0	.062	19	82.6	.517	16	72.7	.582
	No	37	67.3		39	79.6		36	73.5	
Inservice training for nurses	Yes	30	76.9	.363	34	89.5	.026	29	87.9	.038
	No	24	70.6		21	67.7		22	66.7	

[1]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Sources: Provider Survey and Follow-Up Provider Survey

(4) Acceptance and Services, Staffing, and Training: Three of the five service variables were significantly related to acceptance of the experiment by hospital administrators. Table III.12 shows that a higher proportion of administrators from hospitals providing speech therapy, social services, and patient activities, wanted the experiment continued. Only speech therapy was significantly related to acceptance by directors of nursing. A higher proportion of chiefs of staff from hospitals providing physical therapy, speech therapy, and/or social services wanted the experiment continued. The fact that provision of a number of the five services was significantly related to acceptance may reflect a greater commitment to, and familiarity with, long-term care in those hospitals offering these services. Also, since all five services were generally more available in central Iowa, where acceptance was highest, the findings may be due in part to state and project characteristics.

Nurse training was significantly related to acceptance of the experiment by hospital administrators, directors of nursing, and chiefs of staff (see Table III.12). Administrators of hospitals where nurses had prior training in rehabilitative nursing were more likely to want the experiment continued, and directors of nursing and chiefs of staff of hospitals where nurses had received inservice training by project staff were also more likely to want the experiment continued.

T-tests were used to determine if there were significant differences in staffing between hospitals where the staff wanted the experiment continued and those where the staff did not want it continued. Table III.13 indicates that hospitals in which the administrator wanted the project continued had more registered nurses than hospitals in which the administrator did not want it continued. In hospitals which relied heavily on licensed practical nurses, all three types of staff surveyed (hospital administrators, directors of nursing, and chiefs of staff) tended not to want the experiment continued. Since use of RNs was more prevalent in Iowa and South Dakota, where project acceptance was high, and use of LPNs was more prevalent in Texas, where acceptance was relatively low, the associations between staffing and a preference to continue with the swing-bed program may be related to the differences in project acceptance noted earlier. Finally, chiefs of staff who favored the experiment tended to come from hospitals with a higher physician-to-bed ratio.

(5) Overall Acceptance: A logistic regression analysis was performed to identify those variables best able to discriminate between hospital administrators, directors of nursing, and chiefs of staff in terms of their tendency to accept the project. Among hospital administrators, three factors were consistently related to acceptance of the projects. Administrators who joined to better utilize staff were significantly more likely to want the projects continued in their hospitals ($p<.05$ using a chi-square test for the significance of the individual coefficient in the logit function). Administrators in Texas and those in hospitals with higher numbers of LPNs per 100 beds (both of which were closely related to each other) were significantly less likely to want

TABLE III.13:

Staffing Characteristics of Hospitals by Desire to Continue in the Swing-Bed Experiments and Staff Position.

Staffing Characteristics	Desire to Continue in the Swing-Bed Experiments: Hospital Administrators Yes	Hospital Administrators No	Directors of Nursing Yes	Directors of Nursing No	Chiefs of Staff Yes	Chiefs of Staff No
FTE RNs per 100 Beds						
Mean	25.8	20.7	24.6	22.2	24.5	25.5
St. Dev.	10.3	7.0	10.2	8.4	9.3	12.2
No. of hospitals	57	21	58	14	52	19
	p=.039[1]		p=.414[1]		p=.720[1]	
FTE LPNs per 100 Beds						
Mean	12.6	29.4	14.0	25.7	14.8	23.8
St. Dev.	10.8	11.9	11.6	15.4	12.7	13.3
No. of hospitals	57	21	58	14	52	19
	p<.001[1]		p=.002[1]		p=.012[1]	
Staff Physicians per 100 Beds						
Mean	10.8	13.0	10.6	12.5	11.8	8.9
St. Dev.	6.1	6.5	6.0	7.0	6.4	4.9
No. of hospitals	55	19	56	13	51	19
	p=.180[1]		p=.345[1]		p=.079[1]	

[1]Value is the exact p-value, or significance level, associated with the two sample t-test for mean differences.

Sources: Provider Survey and American Hospital Association Survey

the projects continued ($p<.05$). Among directors of nursing, the overall logistic regression equation was statistically significant ($p<.001$) but none of the individual independent variables had a statistically significant relationship to acceptance. For chiefs of staff, the provision of inservice training in long-term care to nursing staff ($p<.05$) and the number of staff physicians per 100 beds ($p<.05$) were positively related to acceptance, while the number of LPNs per 100 beds (perhaps representing location in Texas) was negatively related to acceptance ($p<.05$).

2. Nursing Home Administrator Acceptance

As stated in Section A, the nursing home administrator analysis concentrates on variation across projects in terms of the desire of nursing home administrators to have a national swing-bed program implemented. Nursing home characteristics, the administrator's perception of the need for more long-term care in the county, and the perceived effect of the swing-bed experiment on nursing home utilization were examined first across the three projects. These factors were then analyzed to determine which ones explain why some nursing home administrators want a national swing-bed program implemented while others do not.

a. Facility Characteristics: The average occupancy rate for the nursing homes in the organizational evaluation sample was 96.9% in 1978. There were no significant differences across the projects; average occupancy of the nursing homes was 91.0% in Texas, 98.5% in western Iowa/South Dakota, and 99.0% in central Iowa ($p=.438$). The average number of beds for the sample nursing homes was 84.4. Nursing homes located in western Iowa/South Dakota tended to be smaller than those located in central Iowa and Texas. The average number of licensed beds was 69.6 for western Iowa/South Dakota nursing homes, compared to 95.8 for central Iowa nursing homes and 98.6 for Texas nursing homes ($p=.050$).[13] Almost half of the nursing homes (47.0%) were located in counties with swing-bed hospitals.

Overall, less than 10% of the sample nursing homes were certified by Medicare; over 90% were certified by Medicaid, as shown in Table III.14. There were no significant differences across the projects in the proportion of nursing homes certified by Medicare or Medicaid.

Greater than 90% of the nursing homes provided intermediate level care, with slightly less than 40% providing personal care and approximately 35% providing skilled care. Central Iowa had significantly fewer nursing homes providing skilled care than the other two projects.

b. Need for Long-Term Care in County of Nursing Home: The find-

[13] Value is the exact p-value, or significance level, for the F-test associated with one-way analysis of variance.

TABLE III.14:

Frequency and Percentage Distribution of Nursing Homes by Nursing Home Characteristics, Need for Additional Long-Term Care, Perceived Effect of the Swing-Bed Experiment on Nursing Home Utilization, Acceptance of a National Swing-Bed Program, and Project.

	Frequency and Percentage of Nursing Homes								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif. Level
	N	%	N	%	N	%	N	%	
Nursing Home Characteristics									
Medicare certification	4	10.8	6	8.2	5	10.2	15	9.4	.419[1]
Medicaid certification	36	97.3	67	91.8	47	95.9	150	94.3	.173[1]
Skilled care provided	15	44.1	28	40.0	10	21.3	53	35.1	.052[2]
Intermediate care provided	32	94.1	64	91.4	44	93.6	140	92.7	.399[1]
Personal care provided	16	47.1	27	38.0	17	36.2	60	39.5	.578[2]
Perceived Need for Long-Term Care									
Skilled care needed in county	4	13.8	15	23.8	17	42.5	36	27.3	.021[2]
Intermediate care needed in county	3	9.4	8	12.7	5	11.1	16	11.4	.479[1]
Personal care needed in county	7	25.0	27	43.5	16	44.4	50	39.7	.197[2]
Perceived Effect on Nursing Home Utilization									
Project decreased nursing home utilization	3	7.9	20	28.2	8	16.3	31	19.6	.031[2]
Acceptance of a National Swing-Bed Program									
Desire to have a national swing-bed program implemented	8	42.1	33	56.9	28	73.7	69	60.0	.057[2]

[1]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

Source: Nursing Home Administrator Survey

ings on the administrators' perceptions of the need for more long-term care in their county generally coincided with the findings on levels of care provided. As indicated in Table III.14, slightly over 10% of the nursing home administrators felt there was a need for more intermediate care in their county, compared to approximately 30% who felt there was a need for more skilled care and 40% who felt there was a need for more personal care. This may be related to the fact that fewer administrators of personal care homes responded to the survey.

c. Perceived Effect on Nursing Home Utilization: Approximately 20% of the nursing home administrators felt that the swing-bed experiment had decreased utilization of their facility. A larger proportion of the nursing home administrators in western Iowa/South Dakota than in the other two projects expressed this opinion, possibly because the western Iowa/South Dakota project had the highest utilization by intermediate and personal care patients. (Section D.2 of Chapter IV presents more detailed results regarding impacts on nursing home utilization.)

d. Acceptance of a National Swing-Bed Program: Sixty percent of the nursing home administrators who responded to the question on implementation of a national swing-bed program felt that such a program should be implemented, on the assumption that some restrictions would be applied.[14] As indicated in Table III.14, acceptance of a national swing-bed program was highest in central Iowa, followed by western Iowa/ South Dakota and Texas.

e. Factors Related to Nursing Home Administrators' Attitudes on National Implementation: Table III.15 relates the factors discussed in Sections 2.a through 2.c to acceptance of a national swing-bed program by nursing home administrators. It indicates that fewer administrators of nursing homes providing intermediate care would support a national swing-bed program, while more administrators of facilities which provide personal care would support a national program. Administrators who felt there was a need for more skilled care and a need for more personal care in their county also tended to favor a national program. Finally, a greater percentage of nursing home administrators who felt the experiment had decreased utilization of their facility were opposed to a national swing-bed program. However, this percentage is marginally significant (p=.102) in comparison with the percentage of administrators who favored such a program yet felt the experiments had decreased the utilization of their facility. Location in a county with a swing-bed hospital was not significantly related to acceptance.

Logistic regression analysis, using the previously mentioned factors as independent variables, indicated that administrators who reported a need for more personal level long-term care in the county in which their nursing homes were located, or whose nursing homes had high

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[14]Nursing home administrators' suggestions as to what these restrictions should be are discussed in Section D.3.

TABLE III.15:

Frequency and Percentage Distribution of Nursing Home Administrators Favoring a National Swing-Bed Program by Nursing Home Characteristics, Perceived Need for Long-Term Care, and Perceived Effect of the Swing-Bed Experiment on Nursing Home Utilization.

Frequency and Percentage of Nursing Home Administrators Favoring a National Swing-Bed Program

	Yes		No		Total		Signif. Level[2]
	N	%	N	%	N	%	
Nursing Home Characteristics							
Medicare certification	5	7.2	7	15.2	12	10.4	.145
Medicaid certification	66	95.7	46	100.0	112	97.4	.212
Skilled care provided	25	38.5	19	42.2	44	40.0	.421
Intermediate care provided	60	92.3	45	100.0	105	95.5	.067
Personal care provided	28	42.2	13	28.9	41	36.9	.105
Location in a project county	36	66.7	33	54.1	69	60.0	.115
Perceived Need for Long-Term Care							
Skilled care needed in county	24	37.5	8	18.2	32	29.6	.024
Intermediate care needed in county	7	10.6	3	6.7	10	9.0	.361
Personal care needed in county	30	48.4	10	27.0	40	40.4	.029
Perceived Effect on Nursing Home Utilization							
Project decreased nursing home utilization	14	20.3	15	32.6	29	25.2	.102

[1]These refer to whether the characteristic, etc., in the left-hand column is present or absent. Thus the first line of the first column gives the percentage of administrators of Medicare-certified nursing homes who favored a national swing-bed program, while the second column gives the percentage of administrators of non-Medicare-certified nursing homes who favored a national swing-bed program.

[2]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Source: Nursing Home Administrator Survey

occupancy rates, were significantly more likely to express acceptance of the swing-bed project ($p<.05$). Conversely, those who reported that the swing-bed experiment had decreased utilization in their facility were significantly less likely to want the swing-bed projects continued ($p<.10$).

3. Benefits, Problems, and Suggestions

The benefits and problems encountered by the staffs of admitting hospitals were compared by project, as were the benefits and problems perceived by administrators of nursing homes located in the project states. The intent was to determine whether the benefits and problems encountered were indicative of swing-bed care in general or were peculiar to a specific project (or projects). Suggestions for a national swing-bed program were compared for hospital and nursing home administrators, to assess differences in suggestions based on experience with swing-bed care versus experience with nursing home care in the project states.

a. Benefits and Problems Encountered in Admitting Hospitals: The analysis of benefits and problems encountered in admitting hospitals is based only on the 61 hospitals which admitted swing-bed patients in either 1976 or 1977. As discussed in Section C.3, structured questions were used to survey hospital administrators, directors of nursing, chiefs of staff, and staff physicians on the benefits and problems encountered as a result of participating in the swing-bed experiment. Questions were directed toward those staff members judged to be most knowledgeable about each particular benefit or problem.

(1) Benefits: As indicated in Table III.16, there was a high level of consensus among hospital staff that the swing-bed experiment met a need for long-term care in their community. This benefit was mentioned by approximately 85% of the hospital administrators, directors of nursing, and chiefs of staff, and by 98% of the staff physicians.[15]

Meeting a need for long-term care was the benefit most frequently mentioned by hospital administrators, followed by more efficient use of space and more efficient use of nursing staff. Slightly over 50% of the administrators responded that the project had increased hospital occupancy or revenue.

In the three areas in which they were questioned, directors of nursing followed the same pattern as hospital administrators, frequently mentioning the satisfaction of a need for long-term care and more ef-

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[15]Since the Staff Physician Survey was a mail survey, there was a higher percentage of missing data. As mentioned in Section B, the high percentage of staff physicians mentioning this benefit might have been less if all the staff physicians had responded to the question.

TABLE III.16:

Frequency and Percentage Distribution of Hospital Staff by Benefits Associated with Participation in the Swing-Bed Experiments and Staff Position (Admitting Hospitals Only).

Benefits Associated with Participation in the Swing-Bed Experiments	Frequency and Percentage of Hospital Staff[1]								
	Hospital Administrators		Directors of Nursing		Chiefs of Staff		Staff Physicians		Signif. Level
	N	%	N	%	N	%	N	%	
Increased hospital revenue	29	51.8							--
Increased hospital occupancy	35	57.4							--
More efficient use of nursing staff	45	75.0	35	61.4					.083[2]
More efficient use of space	48	78.7	41	68.3					.139[2]
Met a need for long-term care in the community	52	85.2	50	84.7	53	88.3	55	98.2	.679[3]
Better continuity of care							61	88.4	--
Easier for physicians to see patients							55	82.1	--

[1]The number of respondents to each question ranged from 56 to 67; not all staff were asked about all possible benefits. The number of staff physicians exceeded the number of admitting hospitals because more than one staff physician per hospital responded to the survey.

[2]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

[3]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the different staff types.

Source: Provider Survey and Staff Physician Survey

ficient use of space and nursing staff as benefits of the swing-bed approach. A significantly higher proportion of hospital administrators than directors of nursing saw more efficient use of nursing staff as a benefit of the swing-bed program.

Chiefs of staff were asked only whether the experiment met a need for long-term care in their community, although their opinions were included (or at least represented) in the responses of staff physicians on three potential benefits. As with hospital administrators and directors of nursing, the benefit mentioned most often by staff physicians was meeting a need for long-term care in the community. The second most frequently mentioned benefit was that the experiment helped them to provide better continuity of care and made it easier for them to see long-term care patients.

In order to compare benefits across projects, one staff member was chosen as the source of data for each benefit. Comparison of other benefits mentioned by project, presented in Table III.17, indicates that the staff of western Iowa/South Dakota and central Iowa hospitals mentioned each benefit more often than staff of Texas hospitals. This applied for all three types of staff members providing information on benefits and was most pronounced for benefits associated with increased hospital revenue and occupancy.

(2) Problems: None of the problems encountered in participating hospitals were mentioned by more than 50% of the hospital staff surveyed, as indicated in Table III.18. The problems mentioned most frequently were: inadequate reimbursement to the hospitals for providing swing-bed care, mentioned by 43% of the administrators; inadequate orientation for physicians, mentioned by 42% of the staff physicians and 40% of the chiefs of staff; and the reluctance of physicians to admit long-term care patients, mentioned by 40% of the administrators.

The concern of hospital administrators with the adequacy of reimbursement may result from administrators thinking in terms of full, rather than incremental, cost. As discussed in Chapter VI, Section E, the reimbursement provided under all three projects was more than adequate to cover the incremental cost of providing swing-bed care. The problems of inadequate orientation for physicians and reluctance of physicians to admit long-term care patients may stem from the difficulty of convening physicians for orientation and their consequent lack of familiarity with admission procedures.

In addition to their concern about reimbursement, other problems frequently mentioned by hospital administrators were difficulty completing the utilization reports required as part of participation in the projects and the reluctance of nurses to provide swing-bed care.

The principal concern of directors of nursing was the lack of appropriate services to provide long-term care. Other frequently mentioned problems were inadequate orientation for the nursing staff, inadequate numbers of nurses, and the reluctance of nurses to provide long-

TABLE III.17:

Frequency and Percentage Distribution of Hospital Staff by Benefits Associated with Participation in the Swing-Bed Experiments and Project (Admitting Hospitals Only).

Benefits Associated with Participation in the Swing-Bed Experiments	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif. Level
	Frequency and Percentage of Hospital Staff[1]								
	N	%	N	%	N	%	N	%	
Increased hospital revenue (ADM)	4	20.0	12	75.0	13	65.0	29	51.8	.002[2]
Increased hospital occupancy (ADM)	7	33.3	14	73.7	14	66.7	35	57.4	.020[2]
More efficient use of nursing staff (DNS)	8	40.0	13	81.3	14	66.7	35	61.4	.034[2]
More efficient use of space (ADM)	11	52.4	16	84.2	21	100.0	48	78.7	.001[3]
Met a need for long-term care in the community (ADM)	12	57.1	10	100.0	21	100.0	52	85.2	<.001[3]
Better continuity of care (MD)	7	58.3	21	95.5	33	94.3	61	88.4	.001[3]
Easier for physicians to see patients (MD)	6	54.4	19	95.0	30	83.3	55	82.1	.021[3]

[1]Abbreviations in parentheses indicate the hospital staff member supplying information on each benefit. ADM indicates hospital administrators; DNS, directors of nursing; and MD, staff physicians. The number of respondents ranged from 56 to 69.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

[3]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Source: Provider Survey and Staff Physician Survey

TABLE III.18:

Frequency and Percentage Distribution of Hospital Staff by Problems Encountered as a Result of Participation in the Swing-Bed Experiments and Staff Position (Admitting Hospitals Only).

Problems Encountered as a Result of Participation in the Swing-Bed Experiments	Frequency and Percentage of Hospital Staff[1]								
	Hospital Administrators		Directors of Nursing		Chiefs of Staff		Staff Physicians		Signif. Level
	N	%	N	%	N	%	N	%	
Completion of reimbursement forms	15	25.9							
Completion of reporting forms	19	32.2							
Inadequate reimbursement to hospitals	24	42.9							
Inadequate staffing	3	5.0	13	21.3	5	8.6			.014[2]
Inadequate orientation	14	23.3	14	23.7	23	39.7	28	41.8	.035[2]
Inadequate technical assistance	10	16.9	5	8.5	7	12.1	16	28.6	.023[2]
Lack of appropriate services	13	21.7	17	27.9	13	22.4			.859[2]
Lack of physical space	6	10.0	10	16.4	10	17.2			.678[2]
Nurses reluctant to provide long-term care	9	31.7	13	21.3					.139[3]
Physicians reluctant to admit long-term care patients	23	39.7	11	18.6	8	14.0			<.001[2]

[1]The number of respondents to each question ranged from 56 to 67; not all staff were asked about all possible problems.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the different staff types.

[3]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Source: Provider Survey and Staff Physician Survey

term care.

Other than the concern about orientation for physicians, the only problem mentioned by more than 20% of the chiefs of staff was the lack of appropriate services for swing-bed patients in their hospitals. A substantial number of staff physicians mentioned that they received inadequate technical assistance from the project staff.

Comparison of the problems encountered by type of staff indicates that more chiefs of staff and staff physicians than hospital administrators and directors of nursing reported a problem with orientation. This result coincides with the finding in Section D.1 that fewer chiefs of staff and staff physicians than hospital administrators and directors of nursing attended orientation sessions sponsored by the project staff. Staff physicians reported problems with technical assistance significantly more often than other staff members. More directors of nursing had problems with nurse staffing than chiefs of staff had with medical staffing, or hospital administrators had with staffing in general. Finally, a higher proportion of administrators than directors of nursing and chiefs of staff reported that physicians were reluctant to admit swing-bed patients.

To compare the frequency of problems by project, a single staff member was chosen as the source of information on each problem. Inadequate reimbursement (reported in 42.9% of all hospitals), inadequate orientation for the medical staff (39.7%), and completion of reporting forms (32.2%), were the most frequently encountered problems as a result of participation in the swing-bed experiment, as Table III.19 indicates. Within the three experiments, completion of reporting forms and inadequate orientation for medical staff were the most common problems in central Iowa, inadequate reimbursement and orientation for nursing staff were most frequent in western Iowa/South Dakota, and inadequate reimbursement and orientation for medical staff were most common in Texas. Given the low rate of attendance at orientation in Texas, these findings may indicate that orientation was judged inadequate because respondents did not attend or that those who attended rated it inadequarte while those did not attend felt it was adequate.

There were seven significant differences in the frequency of individual problems across the three projects. Five problems, (1) completion of reimbursement forms, (2) inadequate reimbursement to hospitals, (3) inadequate nurse staffing, (4) inadequate orientation of medical staff, and (5) inadequate technical assistance, were significantly more frequent in Texas than in the other two projects. Problems with reimbursement forms may be partly attributable to the fact that the project staffs in Iowa and South Dakota were from the Medicare fiscal intermediaries for the hospital, and thus may have been better able to explain how to complete reimbursement forms. As mentioned in Section D.5, Texas hospitals tended to have a smaller proportion of RNs and a larger proportion of LPNs than hospitals in the other two projects, which may have rendered it more difficult for Texas hospitals to provide swing-bed

TABLE III.19:

Frequency and Percentage Distribution of Hospital Staff by Problems Encountered as a Result of Particpation in the Swing-Bed Experiments and Project (Admitting Hospitals Only).

Problems Encountered as a Result of Participation in the Swing-Bed Experiments	Frequency and Percentage of Hospital Staff[1]								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif.
	N	%	N	%	N	%	N	%	Level
Completion of reimbursement forms (ADM)	10	55.6	2	10.5	3	14.3	15	25.9	.002[2]
Completion of reporting forms (ADM)	7	35.0	1	5.3	11	55.0	19	32.2	.004[2]
Inadequate reimbursement to hospitals (ADM)	13	61.9	6	37.5	5	26.3	24	42.9	.066[2]
Inadequate staffing (all staff) (ADM)	2	10.0	1	5.3	0	0.0	3	5.0	.265[3]
Inadequate nurse staffing (DNS)	8	38.1	3	15.8	2	9.5	13	21.3	.025[3]
Inadequate medical staffing (COS)	1	5.6	3	15.8	1	4.8	5	8.6	.192[3]
Inadequate orientation-all staff (ADM)	6	30.0	4	21.1	4	19.0	14	23.3	.290[3]
Inadequate orientation-nursing staff (DNS)	4	20.0	6	33.3	4	19.0	14	23.7	.205[3]
Inadequate orientation-medical staff (COS)	11	61.1	4	21.1	8	34.8	23	39.7	.044[2]
Inadequate technical assistance (ADM)	6	30.0	2	11.1	2	9.5	10	16.9	.064[3]
Lack of appropriate services (DNS)	8	38.1	5	26.3	4	19.0	17	29.7	.381[2]
Lack of physical space (DNS)	6	28.6	4	21.1	0	0.0	10	16.4	.009[3]
Nurses reluctant to provide long-term care (DNS)	4	19.0	5	26.3	4	19.0	13	21.3	.372[3]
Physicians reluctant to admit long-term care patients (COS)	3	16.7	1	5.3	4	20.0	8	14.0	.175[3]

[1]Abbreviations in parentheses indicate the hospital staff member supplying information on each problem. ADM indicates hospital administrators; DNS, directors of nursing; and COS, chiefs of staff.

[2]Value is the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

[3]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Source: Provider Survey

TABLE III.20:

Frequency and Percentage Distribution of Nursing Home Administrators by Perceived Benefits of Swing-Bed Care and Project Location.

Perceived Benefits	Frequency and Percentage of Nursing Home Administrators								
	Texas		Western Iowa/ South Dakota		Central Iowa		Total		Signif. Level
	N	%	N	%	N	%	N	%	
Provides care when nursing home beds are unavailable	5	50.0	21	47.7	16	57.1	42	51.2	.738[1]
Financial help to hospitals	3	30.0	13	29.5	7	24.1	23	27.7	.396[2]
Availability of hospital staff to provide care	4	40.0	10	22.7	8	28.6	22	26.8	.258[2]

[1]Values are the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

[2]Values are the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. Projects with similar proportions were combined for statistical testing.

Source: Nursing Home Administrator Survey

care. Problems with completion of project reporting forms were significantly more frequent in central Iowa than in the other two swing-bed projects, while lack of physical space was significantly less frequent in the central Iowa hospitals.

b. Benefits and Problems Perceived by Nursing Home Administrators: The benefits and problems reported by nursing home administrators were in response to questions on the Nursing Home Administrator Survey which asked for the major benefits and problems of providing long-term care in acute care hospitals. Administrators' responses were classified into three major benefits and five major problems. Benefits and problems mentioned by less than 10% of the respondents were excluded from the analysis.

Table III.20 shows that the most frequently mentioned benefit among nursing home administrators of the swing-bed experiment was the ability of hospitals to provide long-term care when nursing home beds are unavailable. This benefit is analogous to the major benefit mentioned by hospital staff, that of meeting a need for long-term care in the community. The only other benefits mentioned by more than 10% of the nursing home administrators were the potential for swing-bed care to help hospitals financially and the greater number of staff typically associated with hospitals. There were no significant differences across projects in the benefits reported by nursing home administrators. Concern about the adequacy of hospital staffing was the most frequently mentioned problem among nursing home administrators, as shown in Table III.21. Although 27% of the nursing home administrators felt that the staffing resources available in acute care hospitals were a benefit, 47% felt that hospitals do not have sufficient staffing to provide both acute care and long-term care. Other problems mentioned by nursing home administrators with providing long-term care in acute care hospitals were that: (1) costs are higher in hospitals than in nursing homes; (2) quality of care may be poorer in hospitals; (3) competition from hospitals for long-term care patients might hurt nursing homes financially; and (4) hospitals do not represent a "home-like" environment. There were no significant differences across projects in the problems reported by nursing home administrators.

c. Suggestions Made by Hospital Administrators and Nursing Home Administrators: Hospital and nursing home administrators were asked specific questions on eligibility requirements for hospitals wanting to participate in a national swing-bed program. Of the 53 hospital administrators who responded to the questions on the Follow-Up Provider Survey regarding national implementation, 83.0% indicated that a national swing-bed program should be implemented. Of the 115 nursing home administrators responding to the question on the Nursing Home Administrator Survey, 60.0% indicated that a national swing-bed program should be implemented. Findings described in the remainder of this section are based only on the responses of those hospital and nursing home administrators who felt a national program should be implemented.

Table III.22 indicates that the majority of hospital and nursing home administrators felt that a national program should be restricted to (1) hospitals in rural areas and (2) hospitals without a skilled nursing facility in their service areas. Less than half of the administrators of both types of facilities felt a national swing-bed program should be restricted to hospitals without an intermediate care facility in their service areas. A significantly higher porportion of hospital administrators than nursing home administrators felt a

TABLE III.21:

Frequency and Percentage Distribution of Nursing Home Administrators by Perceived Problems of Swing-Bed Care and Project Location.

Perceived Problems	Texas N	Texas %	Western Iowa/ South Dakota N	Western Iowa/ South Dakota %	Central Iowa N	Central Iowa %	Total N	Total %	Signif. Level[1]
	Frequency and Percentage of Nursing Home Administrators								
Insufficient staffing	15	51.7	31	51.7	14	35.9	60	46.9	.259
Higher cost to patients	7	24.1	16	26.7	10	25.6	33	25.8	.968
Quality of care	8	27.6	15	25.0	9	23.1	32	25.0	.914
Hurts nursing homes financially	2	6.9	15	25.0	7	17.9	24	18.8	.121
Hospital not a "home-like" environment	2	6.9	9	15.0	8	20.5	19	14.8	.295

[1]Values are the exact p-value, or significance level, associated with the chi-square test for the equality of proportions across the three projects.

Source: Nursing Home Administrator Survey

TABLE III.22:

Frequency and Percentage Distribution of Administrators by Suggestions for a National Swing-Bed Program and Type of Facility.

Suggestions for a National Swing-Bed Program	Hospital Administrators N	Hospital Administrators %	Nursing Home Administrators N	Nursing Home Administrators %	Total N	Total %	Signif. Level[1]
Hospital Entry Requirements							
Location in a rural area	26	74.3	26	53.1	52	61.9	.039
No SNF in service area	24	70.6	41	67.2	65	68.4	.460
No ICF in service area	13	44.8	18	32.7	31	36.9	.196
Levels of Care Allowed							
Skilled	44	100.0	59	92.2	103	95.4	.068
Intermediate	25	67.6	18	30.5	43	44.8	<.001
Personal	11	35.5	7	12.7	18	20.9	.014
Required Services							
Physical therapy	24	61.5	62	92.5	86	81.1	<.001
Speech therapy	7	20.6	50	82.0	57	57.0	<.001
Occupational therapy	5	14.7	51	81.0	56	57.7	<.001
Social services	13	37.1	63	92.6	76	73.8	<.001
Patient activities program	7	20.0	58	87.9	65	64.3	<.001

Frequency and Percentage of Administrators (spanning header over the N/% columns)

[1] Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Source: Follow-Up Provider Survey and Nursing Home Administrator Survey

national swing-bed program should include only hospitals located in rural areas.

When asked about the levels of care to be provided in a national swing-bed program, all of the hospital administrators felt that skilled level care should be allowed and nearly 70% believed that intermediate care should also be allowed. Approximately 90% of the nursing home administrators felt that skilled level care was appropriate, but only 30% supported the provision of intermediate care. The majority of hospital and nursing home administrators felt that personal care should not be provided. Comparison of hospital and nursing home administrators indicates that a larger proportion of hospital administrators were in favor of allowing the provision of each level of care under a national program.

There were also significant differences between the proportions of hospital and nursing home administrators who felt that specific services should be required of hospitals participating in a national swing-bed program. The proportion of hospital administrators is significantly lower than the proportion of nursing home administrators in favor of requiring each of the services listed in Table III.22. The only service which over 50% of the hospital administrators felt should be required was physical therapy. By contrast, over 90% of the nursing home administrators said that physical therapy and social services should be required, and over 80% of the nursing home administrators said that speech therapy, occupational therapy, and a patient activities program should be required.

4. Summary of Findings

(1) The most frequent reasons given by hospital administrators for joining the swing-bed project, each of which was mentioned by over 90% of the hospital administrators in the experimental programs, were to increase hospital occupancy, meet a need for long-term care in their communities, and use hospital space more efficiently. Over 80% joined in order to increase staff efficiency and slightly less than 70% joined in order to increase revenue.

(2) Prior to the swing-bed experiments, approximately 21% of the participating hospitals had provided long-term care in a distinct part, 30% had provided long-term care under the Medicare special provision (described in footnote 8, page III.13), and 30% had provided long-term care in acute care beds for private pay patients. More of the hospitals in Iowa and South Dakota than in Texas had operated a distinct part or provided long-term care under the Medicare special provision.

(3) More hospital administrators (77.8%) and directors of nursing (55.6%) attended orientation by the administering agencies than chiefs of staff (24.4%) and staff physicians (30.4%). Approximately 90% of the participating hospitals received information

on admission procedures, completion of monthly utilization reports, and filing of Medicare claims. The proportions of Texas hospital staff attending orientation were substantially lower than the proportions of Iowa and South Dakota hospital staff attending orientation. Fewer Texas hospitals received information on admission procedures, but there were no significant differences across projects in the proportion of hospitals receiving information on completion of monthly utilization reports or filing of Medicare claims.

(4) The long-term care services most frequently available in the participating hospitals were physical therapy and social services, available in 53.1% and 35.8% of the hospitals, respectively. There were significant differences across projects for all five key long-term care services surveyed (physical therapy, speech therapy, occupational therapy, social services, and patient activities), with a larger proportion of central Iowa hospitals providing each of the five services.

(5) Comparisons across projects on nurse staffing indicate that Texas hospitals had fewer registered nurses and more licensed practical nurses than hospitals in Iowa and South Dakota. More of the hospitals in western Iowa/South Dakota had nurses with training in rehabilitative nursing, but more Texas and central Iowa hospitals had nurses who received inservice training from the administering agencies.

(6) Acceptance of the swing-bed experiment was relatively high for all four types of hospital staff surveyed. Over 70% of the hospital administrators and chiefs of staff, and over 80% of the directors of nursing and staff physicians who responded to the surveys wanted the experiment continued. Comparisons across projects indicate that the central Iowa project had the highest level of acceptance among hospital staff, closely followed by the western Iowa/South Dakota project. These differences in hospital staff acceptance were related to several project characteristics. First, more hospital administrators from Iowa and South Dakota joined the experiment in order to meet a need for long-term care in their community. Second, more hospitals in these two projects had previously provided long-term care in either a distinct part or under the Medicare special provision. Third, hospital staff attendance at orientation was higher in these two projects. Fourth, hospitals in these two projects employed more registered nurses and fewer licensed practical nurses than Texas hospitals. Fifth, as indicated in (4) above, central Iowa hospitals had more services available which are often needed by long-term care patients.

(7) Sixty percent of the nursing home administrators who answered the survey question on implementation of a national swing-bed program felt that such a program should be implemented, assuming certain eligibility restrictions, such as those mentioned in (10)

and (11) below, would apply. Nursing home administrators in central Iowa were most receptive to a national swing-bed program, with 73.7% favoring a national program, compared to 56.9% in western Iowa/South Dakota, and 42.1% in Texas.

(8) The benefit of swing-bed care mentioned most frequently by hospital staff members was the satisfaction of a need for long-term care in their respective communities. Comparison of benefits by project indicated that the staffs of Texas hospitals were less likely to report benefits as a result of providing swing-bed care than the staffs of hospitals in Iowa and South Dakota. The problems mentioned most frequently by hospital staff were inadequate reimbursement to hospitals for providing swing-bed care and inadequate orientation for physicians. Both of these problems were encountered in a larger proportion of the Texas hospitals.

(9) The benefit of swing-bed care most often mentioned by nursing home administrators was the capacity of hospitals to provide long-term care when nursing home beds are unavailable. The problem most often mentioned by nursing home administrators was insufficient staffing in hospitals to provide both acute care and long-term care. There were no significant differences across projects in terms of either benefits or problems reported by nursing home administrators.

(10) The majority of hospital and nursing home administrators felt a national program should be restricted to hospitals in rural areas without a skilled nursing facility in their service area.

(11) Hospital administrators and nursing home administrators tended to disagree on both the levels of care which should be allowed under a national program and the number of long-term care services which hospitals should be required to provide. The majority of hospital administrators felt that skilled and intermediate care should be included in a national program, while only 30% of the nursing home administrators favored having intermediate care as part of a national swing-bed program. Of the five long-term care services mentioned in (4) above, the majority of hospital administrators felt that only one service, physical therapy, should be required for swing-bed hospitals, whereas most nursing home administrators felt that all five services should be required.

E. IMPLICATIONS

This section presents the implications of the organizational analysis and focuses on recommendations regarding (1) whether implementation of a national swing-bed program is desirable and (2) how such a program can be most effectively implemented. Since the organizational analysis was largely descriptive in nature, its results bear primarily on

the process of national implementation, rather than on whether or not the program is worthwhile in total. Subsequent analysis components deal more directly with this issue.

(1) The number of hospital staff members expressing an interest and a willingness to participate in the swing-bed experiments indicates that from the perspective of the hospital in general, the swing-bed concept is a viable method of providing long-term care in rural areas. While the staffs of hospitals participating in the experiments can be regarded as self-selected and possibly predisposed to favor a swing-bed program, hospitals electing to provide swing-bed care under a national program would also be self-selected. Thus, the degree of acceptance encountered among the staff of experimental hospitals can be considered typical of that which would be encountered among participating hospitals in a national program.

(2) As is stated frequently in this report, the conclusions presented here can be considered applicable only to rural areas. Factors identified as related to acceptance, such as joining the experiment to utilize nursing staff more efficiently or provision of inservice training to nursing staff, may be completely unrelated to acceptance in urban hospitals, which operate with a different set of incentives and constraints.

(3) The findings described here have identified a number of benefits and problems related to the provision of long-term care in acute care hospitals. While the potential benefits associated with swing-bed care will provide most of the initial impetus for hospital participation in a national program, it is the problems encountered, and the manner in which these are resolved, that will determine the ultimate success of such a program. Hence, a closer examination of the problems encountered in the experiment and the extent to which they can be expected to appear in a national program, is relevant to a discussion of a future swing-bed program.

(4) Among administrators, inadequate reimbursement was the most frequently mentioned problem associated with providing swing-bed care. This may have been due in part to the lack of familiarity with incremental cost reimbursement. Among chiefs of staff and staff physicians, inadequate orientation was the most frequently mentioned problem; it was the second most frequent among directors of nursing, after lack of appropriate long-term care services. These three major problems reported by staff members are very likely not peculiar to the experimental situation, and would probably occur in a national swing-bed program.

(5) As discussed in Chapter II, Section B.4, the administering agencies provided orientation and technical assistance to hospital staff, including staff physicians, as part of the experiment. However, the effectiveness of orientation as a tool for informa-

tion dissemination is in some doubt, since a number of hospital staff members were left dissatisfied with the orientation, and many did not attend at all. This was especially true of staff physicians. In addition, use of an orientation procedure to carry out the information dissemination function under a national program is problematic, since orientation of the sort included in the experiment is not a standard practice for HCFA. For this reason, a systematic approach to the distribution of written materials should form the basis for information dissemination, except in the area of reimbursement (as discussed below). The next three implications deal with conclusions and suggestions in this area.

(6) The findings of this study indicate that while inadaquate reimbursement was the most frequently mentioned problem by hospital administrators, it was significantly more prevalent in the Texas project than in the other two projects. A possible explanation for this may be that the administering agency in Texas was the state hospital association, while in the other two projects the administering agencies were also the Medicare fiscal intermediaries for the participating hospitals. It is possible that the understandably closer working relationship (on reimbursement matters) between the hospitals and fiscal intermediaries in western Iowa/South Dakota and central Iowa resulted in a greater understanding of both the concept of incremental cost reimbursement and the procedures for completion of required paperwork. The attribution of problems with inadequate reimbursement and completion of paperwork to lack of knowledge is reinforced by the study findings in Chapter VI. These findings indicate that reimbursement to hospitals for swing-bed care was sufficient to cover the incremental cost of such care and further support the possibility that administrators' perceptions of inadequate reimbursement were more the result of lack of information and an orientation to full cost reimbursement than of the failure of reimbursement to cover costs.

(7) There are two reasons for suggesting the use of an orientation approach, rather than the dissemination of written guidelines only, for dealing with reimbursement-related problems. The first is that these problems, while relatively common, are due in large measure to a fundamental lack of understanding of the incremental cost concept. The second is that there already exists a formal mechanism, the network of Medicare fiscal intermediaries, which can carry out this orientation function with a relatively small additional expenditure of time and money. Topics covered would include: (1) rationale for incremental cost reimbursement; (2) actual reimbursement procedures for routine and ancillary swing-bed care; (3) comparison of incremental reimbursement to incremental cost; (4) effect of swing-bed care reimbursement on acute care allowable cost and reimbursement; (5) effect of swing-bed care on total hospital reimbursement; (6) required changes in claims procedures; and (7) required changes in Medicare Cost Re-

ports. The findings presented in Chapter VI of this report provide information pertinent to points (3) through (5).

(8) Insofar as the other problems encountered in the swing-bed hospitals are concerned, it appears that an orientation more extensive (or intensive) than that carried out under the experimental programs is not a realistic alternative, due to the resources necessary to carry it out on a nationwide basis. Thus, the recommendation of this evaluation is that the information dissemination task which must accompany establishment of a national swing-bed program be performed through the distribution of written material to hospitals which would be eligible to participate. This material would be based upon that used in the orientations prepared for the experimental programs, but would include revisions resulting from the experimental experience. The revision process should have as one of its objectives the focused involvement of selected project managers, administrators, nursing staff, and physicians who participated in the provision of swing-bed care and found it to be appropriate for both hospitals and patients. Topics covered in the written materials should be those identified in the various components of this evaluation as needing special emphasis, especially in the areas of quality of care and reimbursement, which are detailed in Section E of Chapter V and Section F of Chapter VI. Other topics would include: (1) a general statement of the potential benefits of swing-bed care to both hospitals and patients; (2) explanation of applicable regulations and eligibility requirements, especially those related to certificate of need and conditions of participation not waived for the swing-bed program; and (3) a description of the differences between acute and long-term care in terms of the different needs of long-term care patients and the different roles which hospital staff and nursing and medical staff in particular must play in providing long-term care.

(9) While the level of acceptance of the swing-bed concept among nursing home administrators was not as high as that of swing-bed hospital staff (60% versus 75%), the concept has a moderate level of acceptance among a group which might be expected to evidence strong opposition to such a program. Acceptance was not significantly related to proximity to a swing-bed hospital, an indication that acceptance is not simply a matter of greater impact or familiarity. Instead, factors most closely associated with nursing home administrator acceptance were the perception of a community need for more long-term care and high nursing home occupancy rates, an indication that nursing home administrators in locales most likely to be the sites of a national swing-bed program are more likely to support such a program. From the perspective of a nursing home in such a location, a swing-bed program offers the advantage of a nearby location for individuals waiting for space in a fully occupied nursing home. This avoids the need for placement in a nursing home outside the community, which may prove traumatic to the patient, costly to payers, and

may result in permanent loss of a potential resident to the local facility. Findings in Chapter IV of this report indicate that hospitals generally used swing beds for "short-term" long-term care, and thus appear to represent a relatively small threat to nursing homes.

CHAPTER IV

UTILIZATION

A. INTRODUCTION

The analysis presented in this chapter was designed to assess the influence of the swing-bed experiments on acute care and long-term care utilization patterns in the project states. In addition to a summary and analysis of project utilization, two principal areas are discussed: (1) the extent to which swing-bed utilization represents a net increase in institutional long-term care utilization and (2) an estimation of long-term care utilization should the swing-bed option become available on a nationwide scale.

The following section presents an overview of the utilization analysis. Section C contains a discussion of the data sources and methods used for the analyses, while utilization findings are presented in Section D. Implications arising from the utilization analysis are discussed in Section E.

B. OVERVIEW

1. The Utilization Analysis

The findings of the utilization component of the evaluation are presented in four separate stages. A summary of swing-bed utilization in the three experiments is presented first. Comparisons of swing-bed utilization are made among the three states and, where appropriate, utilization statistics are stratified by payer and level of care. The utilization component includes an assessment of the influence of the experiments on participating hospitals in terms of changes in acute care, long-term care, and total hospital utilization. This information, together with the financial analyses discussed in Chapter VI, documents the extent to which the projects influenced hospital utilization patterns and financial position.

Second, an analysis of project utilization was undertaken to determine the sources of swing-bed utilization. In particular, an investigation was made of the extent to which long-term care delivered in project hospitals represented a substitution for other forms of institutional care. Acute care length of stay in project hospitals was examined to determine if the availability of long-term care decreased average acute care length of stay in the hospital. In addition, nursing home occupancy rates were examined to determine if nursing home utilization decreased because of the additional long-term care provided in swing-bed hospitals.

Third, the utilization study contains a series of analyses designed to assess the correlates of swing-bed utilization and predict the amount

of swing-bed utilization under the assumption of a national swing-bed program. This analysis first examines factors which explain differences between admitting and non-admitting hospitals, and then factors which explain the variation in swing-bed utilization among admitting hospitals. As a result, the prediction analysis consists of two parts: (1) a prediction of the number of hospitals that would admit swing-bed patients and (2) a prediction of the number of swing-bed patient days of care that would be provided by admitting hospitals. The prediction analysis was confined to forecasting nationwide swing-bed utilization assuming that only rural hospitals would be eligible to provide swing-bed care.

2. Medicaid Participation, Intermediate and Personal Care

As indicated earlier, the original focus of the experiments was on the rural Medicare beneficiary requiring skilled nursing care. However, in each state having a swing-bed project, state Medicaid programs have participated to some extent. In South Dakota the Medicaid program reimbursed for both skilled and intermediate care delivered in swing-bed hospitals. In the Iowa experiments (that is, the western Iowa portion of the RACC experiment and the Iowa Swing Bed Project), Medicaid paid only the coinsurance for Medicare/Medicaid eligible patients receiving skilled nursing care in project hospitals. Iowa Medicaid did not directly reimburse for either skilled or intermediate care. Texas Medicaid began reimbursing for swing-bed care at the skilled nursing level only in January 1978. As in the case of Medicare, Medicaid reimbursement in the experiments required waiving several requirements for long-term care facilities.

In addition to skilled nursing care, intermediate and personal care were also provided in the experiments. Some of the intermediate care utilization was paid for by Medicaid in South Dakota but, there was also substantial private pay for this level of care in both South Dakota and Iowa. Therefore, the utilization study to be discussed below has a much broader payer focus than simply Medicare. It addresses utilization questions of consequence to both the Medicare and Medicaid programs, and also issues in intermediate, personal, and skilled nursing care.

C. METHODS

This section describes the methodologies employed in the utilization analysis by first discussing data sources and then describing the technical methods and certain conceptual issues associated with: (1) the analysis of project utilization; (2) the determination of the extent of substitution; and (3) the analysis of correlates of utilization, including national prediction. Results based on statistical tests are considered significant at the .10 level. However, exact significance levels are presented in most instances.

TABLE IV.1:

Data Sources Used in the Utilization Analysis.

Data Source	Year	Data Obtained and Sample
Medicare Cost Reports[1]	1974-1978	Data Obtained: Swing-bed and acute care utilization statistics. Samples: Participating hospitals (N=82) and comparison hospitals (N=82).
Quarterly project reports from the Texas Hospital Association, Blue Cross of Western Iowa and South Dakota, and Blue Cross of Iowa	1976-1978	Data Obtained: Swing-bed patient days by level of care and number of swing-bed admissions. Sample: Admitting hospitals (N=61).
South Dakota Department of Health	1974-1977	Data Obtained: Nursing home occupancy rates. Sample: Nursing homes in counties with admitting swing-bed hospitals (N=14).
Health Care Financing Administration, Office of Policy, Planning, and Research	1974-1977	Data Obtained: Medicare-certified SNF beds and Medicare enrollees. Sample: Counties in Texas, South Dakota, and Iowa (N=75).
American Hospital Association (AHA) Hospital Survey[2]	1975-1977	Data Obtained: Utilization data. Samples: Participating hospitals (N=82) and 25% sample of rural hospitals in the U.S. (N=627).
National Center for Health Statistics, Master Facility Inventory	1976	Data Obtained: Long-term care beds and long-term care facility occupancy rates for nursing homes. Samples: Project counties (N=75) and counties in the 25% sample of rural hospitals in the U.S. (N=570).
County and City Data Book[2]	1970-1976	Data Obtained: Demographic data and economic characteristics. Sample: Project counties (N=75).
Provider Survey for Hospital Administrators[1] Follow-Up Provider Survey[1]	1976-1978 1976-1979	Data obtained: Sources of admission for swing-bed patients, factors limiting project use, other long-term care providers in hospital area. Sample: Participating hospitals (N=82).

[1]Copies of data collection instruments are in the Data Forms Supplement.

[2]Publication is listed in the References.

1. Data Sources

Table IV.1 lists the data sources for the utilization analyses. The two years prior to the project, 1974 and 1975, were used as baseline years for comparison purposes for a number of analyses. However, for some of the demographic data based on the 1970 census and published revisions or estimates by the Census Bureau, years other than 1974 or 1975 were used.

Hospitals and nursing homes providing care to Medicare beneficiaries are required to submit a cost report at the end of each fiscal year. These reports, termed Medicare Cost Reports (MCRs), were an important data source for both the utilization and financial analyses. In addition to financial information, the reports contain utilization statistics such as the number of bed days available, acute care admissions, acute care patient days, and similar information on distinct-part utilization. Cost report data were obtained for both study hospitals and a similar group of comparison hospitals (discussed in Section 3.a). As part of the incentive calculation required by the experiments, participating hospitals were required to complete an additional worksheet which contained information on swing-bed care days by payer. A more detailed discussion of the financial data available from the cost reports is presented in Chapter VI, Section D.1. Sample copies of the MCR and supplemental worksheets are contained in the Data Forms Supplement.

Since Medicare Cost Reports contain data corresponding to each facility's fiscal year, it was necessary to assign the various hospital fiscal years to specific calendar years for purposes of this study. The calendar year and fiscal year were coterminous for 33% of the study hospitals. If a hospital fiscal year end was between June and December 1977 inclusive (65% of study hospitals), utilization data from the Medicare Cost Report for that fiscal year were treated as 1977 data. For a hospital with a fiscal year end between January and May 1977 inclusive (2% of the hospitals), data were treated as corresponding to calendar year 1976. This policy was followed for all years to which study data pertain.

Certain swing-bed utilization data, not available from the Medicare Cost Reports, were taken from the quarterly reports prepared by the administering agencies. In particular, information on utilization by levels of care and swing-bed admissions were obtained from these reports.

County-wide occupancy rates for nursing homes were obtained by aggregating data available from the 1976 Master Facility Inventory Survey conducted by the National Center for Health Statistics. For other analyses specific to South Dakota, nursing home occupancy rates were obtained from the state Department of Health in South Dakota. Data on the number of Medicare-certified SNF beds and Medicare enrollees for the project states were obtained from the Health Care Financing Administration, Office of Policy, Planning, and Research. Data from

the American Hospital Association on financial, utilization, and staff characteristics of hospitals were used in the prediction analysis. Demographic and economic statistics also used in the prediction analysis were obtained from the County and City Data Book. As indicated in Chapter III, a number of surveys were conducted as part of this evaluation. The Provider Survey and the Follow-Up Provider Survey, administered in the spring of 1978 and the spring of 1979, respectively, contained questions designed for the utilization study. A copy of both surveys is contained in the Data Forms Supplement.

2. Analysis of Project Utilization

For purposes of these analyses, swing-bed utilization was defined as days or admissions attributable to patients receiving long-term care in hospital acute care beds. Days of care provided in either distinct parts or attached nursing home facilities were not considered swing-bed days nor were they treated as such for reimbursement purposes within the experiments. Since swing-bed admissions began in midyear (July 1976 for the RACC experiments and June 1977 for the central Iowa project), 1976 data for western Iowa, South Dakota, and Texas, and 1977 data for central Iowa were not included in certain analyses requiring a one year time frame. All tables indicate which years were used.

For the most part, utilization statistics are presented by state with data presented separately for central and western Iowa. Because they participated in the same experiment, western Iowa hospitals shared common features with swing-bed facilities in South Dakota. Among these were similar orientation programs, the same administering agency (also their common Medicare intermediary), and a reimbursement system with an incentive payment. On the other hand, swing-bed hospitals in Iowa, regardless of project, were similar with respect to a higher Medicare per diem reimbursement ($33 in western Iowa, $40 in central Iowa, and $17 in South Dakota) and the lack of Medicaid participation in the project. For this reason, data are generally presented for each state separately. However, in some cases, where project experience seemed to be the crucial factor, western Iowa is combined with South Dakota and, where state-level considerations appeared more important, it is combined with central Iowa.

Swing-bed patient days paid for by Medicare or Medicaid were automatically defined as either skilled (Medicare pays only for this level) or intermediate level for reimbursement purposes. Swing-bed days paid privately (out-of-pocket or through third-party commercial insurance) were not routinely associated with a level of care on the Medicare Cost Reports, although quarterly reports for the western Iowa/South Dakota project contained information pertaining to level of care. For central Iowa and Texas, certain decisions on the assignment of private pay patients to a level of care were made on the basis of conversations with the staff of administering agencies who indicated that in central Iowa all private pay days were at the intermediate level, and that in Texas, all private pay days were at the skilled level. The utilization

statistics presented by level of care in this chapter are based on these sources.

Since the results presented in this chapter are also descriptive in nature, the statistical procedures used are similar to those employed in the organizational component of the evaluation. Analysis of variance (ANOVA) was used to test for mean differences in various utilization measures across the three states. For comparisons between years, the two sample t-test for mean differences was used, employing the unequal variances version where appropriate. Fisher's Exact Test was used to test for differences across the projects in terms of the frequency of factors influencing admission of swing-bed patients. Logistic regression was used to further assess the importance of such factors from a multivariate perspective in the analysis of correlates of utilization discussed in Section C.4.

3. Methods Used in the Substitution Analysis

One purpose of the utilization study is to determine if swing-bed utilization is primarily a substitution for other forms of long-term care. If it is not, a net increase in long-term care utilization by the population served by the swing-bed hospitals may be taken as an indication of an unmet demand for long-term care in these rural counties. For the purpose of this analysis, the county served as an approximation for the market or service area of the hospital. It was beyond the scope of the study to conduct a long-term care needs assessment of the rural elderly.

While it is possible that swing-bed utilization might represent substitution of institutional care for non-institutional long-term care, there is little evidence to indicate that this was true. As part of the Provider Survey discussed above, hospital administrators were asked about the availability of non-institutional long-term care in their service areas. Few of the areas affected by the swing-bed projects had certified home health agencies or other forms of noninstitutional long-term care available. Therefore, the utilization analysis concentrated only on questions of substitution among different forms of institutional care. Two types of swing-bed substitution were investigated: (1) substitution of swing-bed care (in particular, skilled nursing care) for acute care and (2) substitution of swing-bed care for nursing home care. T-tests for mean differences were used for statistical comparisons in both areas.

a. Acute Care Substitution: The extended care or skilled nursing care benefit was originally conceived as a less expensive alternative to a continued stay at the acute care level, typically occuring at the end of an acute care stay. For this reason, a minimum three-day acute care stay is required to qualify for the skilled nursing care benefit. Prior to the swing-bed experiments, it was hypothesized that Medicare beneficiaries receiving hospital care in areas with a shortage of certified skilled nursing care beds might be kept at the acute care level longer than was necessary. With the availability of more long-term care beds located within hospitals themselves, patients might be more promptly reclassified to the more appropriate skilled nursing

care level, leading to a decrease in acute care utilization.

This possibility was examined in three ways, all of which involved t-tests. First, in order to determine if there were significant changes in average acute care length of stay and occupancy rates in admitting hospitals, acute care utilization in 1975 (the last pre-project year) was compared with utilization in 1977 and 1978. Second, acute care lengths of stay and occupancy rates in admitting hospitals in both 1977 and 1978 were compared with similar measures in the group of comparison hospitals discussed in the following paragraph. Third, in order to compensate for time trends, admitting hospitals were then compared with the comparison group in terms of the change in length of stay and occupancy rate between 1975 and 1977 (1978).

A group of hospitals was selected from 253 potential hospitals in rural Iowa, South Dakota, and Texas, on the basis of their similarity to project hospitals on a number of key variables likely to influence both swing-bed utilization and cost. These variables included size, occupancy, presence of a long-term care unit, and cost per patient day in 1975. Appendix B presents the variables used, an explanation of the statistical procedures involved, and a table comparing RACC swing-bed and comparison hospitals on each of the key variables.

Information on acute care substitution was also obtained from the survey instruments designed for this study. Specifically, data on (1) the extent to which swing-bed hospitals had previously used the "administratively necessary days" option (discussed in Chapter I, Section B) prior to the experiment and (2) where patients receiving swing-bed care at the time of the interview would have received care in the absence of the experiment, were obtained from the surveys and are presented in the findings section of this chapter.

b. Nursing Home Substitution: It is possible that swing-bed days represent demand that would have been satisfied in existing nursing homes. As indicated earlier, the original intent of the swing-bed approach was to increase the number of Medicare-certified beds available for skilled nursing care in rural areas. While the eligibility criteria for participation in the experiments stated that hospitals must be located in areas where long-term care facilities were unavailable or inadequate, it appears that only facilities providing skilled nursing care were included in this determination. Therefore, while participating hospitals were located in areas without many certified skilled level beds, there were nursing homes within the hospital service areas providing long-term care. To determine if swing-bed utilization represents a substitution for nursing home use, occupancy rates for nursing homes in the project counties in South Dakota were examined.

South Dakota was chosen as the focus of this analysis since: (1) comprehensive nursing home utilization data were available; (2) hospitals in South Dakota experienced swing-bed utilization at all three levels of long-term care (skilled, intermediate, and personal); and (3) swing-

bed care was provided to Medicare, Medicaid (skilled and intermediate level), and private pay patients. This pattern of utilization is more representative of nursing homes and, therefore, more likely to represent demand diverted from the existing long-term care market. Mean occupancy rates for nursing homes in each South Dakota county containing a hospital which had admitted swing-bed patients in 1977 were compared between 1975 and 1977 to determine if there were significant changes in nursing home occupancy rates. A significant decrease in average occupancy could be taken as an indication of a possible reduction in utilization which might be attributable to the swing-bed experiment.

4. Correlates of Utilization and Prediction Analyses

This component of the analysis is concerned with the factors related to swing-bed utilization. First, it provides information on the extent to which specific hospital, project-level, and community characteristics are associated with swing-bed utilization. Second, through an assessment of such factors, forecasts of swing-bed utilization in the event of a national program are presented.

The first objective entailed the assessment of factors related to both the decision of hospitals to admit swing-bed patients and the extent of swing-bed days of care provided by admitting hospitals. Logistic regression (logit analysis) was used to identify factors relating to the tendency of a hospital to be an admitting or non-admitting hospital. The classification or dichotomous dependent variable used in the logit analysis measures whether or not the experimental hospital admitted a swing-bed patient in 1978. Logistic regression was used instead of discriminant analysis because a discriminant analysis requires that the independent variables follow a multivariate normal distribution. Since both continuous and dichotomous independent variables were involved in this analysis, the maximum likelihood estimation procedure and associated approximate significance levels of logistic regression were considered more appropriate.

In order to assess the extent to which several potential correlates of utilization explain the variation in swing-bed days of care provided across hospitals, ordinary least squares regression was used. Earlier work demonstrated a strong similarity between ordinary least squares and simultaneous equation techniques in terms of prediction results. Hence, ordinary least squares was used to assess the correlates of utilization in a "data analytic" manner (see Cooley and Lohnes, 1971) since the statistics associated with ordinary least squares are informative from a substantive perspective.

Two categories of independent variables were used in these analyses. The first consists of variables on which data were available only for the swing-bed hospitals. They correspond to items selected from the various surveys conducted as part of the study, as well as data from Medicare Cost Reports and other sources which provided infor-

mation only for project hospitals. The second category of variables consists of those available for all hospitals throughout the United States and which could therefore be used in the prediction analysis. Consequently, the explanatory power of both the logistic and the ordinary least squares regressions developed using both categories of variables for project hospitals is greater than the explanatory power associated with the prediction methods which use only the variables in the second category.

The data selected for inclusion in these analyses were chosen in accord with conceptual criteria, the empirical results presented in Chapter III dealing with project acceptance, and availability of certain types of data. Factors analyzed included various types of health care supply and demand variables at the county level, hospital characteristics, staffing characteristics, and variables describing the orientation to and attitudes about swing-bed care.

The overall approach taken in the analyses designed to predict national swing-bed utilization was to develop equations which describe the admitting and utilization experience of the swing-bed hospitals in 1978 and to apply them to a randomly chosen sample of rural hospitals from across the nation. In order to do this, it was necessary to make two assumptions. First, it was assumed that a national program will be implemented only in rural (non-SMSA) areas. As mentioned throughout this report, it is beyond the scope of this evaluation to project outcomes associated with a program which allows urban hospitals to provide swing-bed care. Second, it was necessary to assume that the experience of the experimental hospitals would be representative of swing-bed utilization in rural communities across the nation. In fact, the prediction procedures described below took into consideration the potential differences between experimental and other rural hospitals in terms of factors which might influence the amount of swing-bed care provided. These two assumptions and their ramifications in terms of methodological issues such as functional form, extrapolation beyond the range of the independent variables, and overall associations between and among variables, represent key qualifications associated with the entire forecasting methodology discussed here.

The general procedure associated with the approach to prediction is as follows. Initially, a discriminant function was developed which classified project hospitals into two groups: those which admitted at least one swing-bed patient in 1978 and those which did not. This discriminant function correctly classified 70% of project hospitals into the admitting and non-admitting categories and was developed with a set of variables measuring swing-bed hospital and community characteristics. Second, a regression equation using the ratio of swing-bed days to total patient days as the dependent variable was developed which predicted utilization for project hospitals admitting swing-bed patients in 1978 using independent variables from 1977 and earlier years. The discriminant function and the regression equation were then applied sequentially to a sample of rural hospitals (termed the

"national sample") which was a 25% random sample of hospitals in rural areas (defined as all non-SMSA counties in the fifty states) selected from hospitals surveyed for the 1977 American Hospital Association Survey.[1] Without presenting technical details at this point, this resulted in a predicted number of hospitals likely to admit swing-bed patients and a predicted percentage of hospital days which would be swing-bed days. The predicted number of swing-bed days was then obtained for the sample hospitals and this number was multiplied by the reciprocal of the sampling fraction to obtain predicted utilization for the entire United States.

While the paragraph above describes the overall approach taken in the prediction analyses, certain conceptual and technical factors had to be taken into account. These are explained in the following comments.

(a) Since it was not possible to specify the eligibility conditions which would accompany a national program, two separate prediction schemes were developed. First, while state-level certificate of need programs might impose more stringent conditions, it was assumed that any hospital in a rural county where the average nursing home occupancy rate was greater than 80% would be eligible to participate in a national swing-bed program. The group of hospitals eligible to participate under these circumstances is termed Group 1 in the prediction analysis. Second, while it is probable that a national program would not contain any hospital-level eligibility criteria such as bed size or occupancy rate limitations, findings based on the evaluation of the experiments indicate that hospitals with higher acute care occupancy rates are less likely to provide swing-bed care. Therefore, in addition to location in a rural area and location in a county with nursing home occupancy as described above, the criterion that hospitals with acute care occupancy rates of 66.6% or more would not choose to provide swing-bed care was added. The resulting group of hospitals, which is in fact a subset of Group 1 because it restricts hospital occupancy while retaining the other Group 1 criteria, is termed hospital Group 2. The 66.6% occupancy limit was chosen since it corresponds to the highest occupancy rate associated with any swing-bed hospital which admitted swing-bed patients under the experimental program.

(b) It is generally regarded as invalid to apply a multivariate prediction procedure, based either on a classification technique such as a discriminant function or a continuous-variable prediction formula such as a regression equation, beyond the range of the independent variables used in the development of the prediction technique. For this reason, all Group 1 and Group 2 hospi-

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[1] A number of cases in this sample could not be used due to missing data. The size of the sample was, therefore, reduced slightly and contained 21.5% of rural hospitals in the United States.

tals were further divided into two subgroups, termed conforming and non-conforming hospitals.

Conforming hospitals are those which fall within the range of the independent variables which appear in the discriminant function and regression equation used in the prediction process. Non-conforming hospitals consist of those for which the value of at least one independent variable fell outside the range of values for that variable as used in the development of these equations (i.e., the ranges of the experimental hospitals).

(c) In order to assess whether it was necessary to use separate prediction procedures for conforming and non-conforming hospitals, statistical tests were conducted to assess the nature of the interrelationships among the independent variables for the conforming and non-conforming hospital groups. Both discriminant function analysis and regression analysis are multivariate procedures which are based on the relationship among independent variables (as well as the relationship between the dependent variable and independent variables--which relationship, of course, is not available to analyze in the group to which the prediction methods are being applied). Hence, the correlation structure among the independent variables for the conforming hospitals was compared to the correlation structure among independent variables for non-conforming hospitals within both Group 1 and Group 2. If, in fact, no major discrepancies were found between the conforming and non-conforming hospitals in terms of the interrelationships among independent variables, it would be reasonable to assume that prediction formulas which would normally apply only to the conforming hospitals might be acceptable for the non-conforming hospitals as well.

(d) In order to test general similarities in the correlation (matrix) structure among the independent variables, each independent variable was used as a dependent variable in a regression equation, which explained its variation in terms of all other independent variables--for both the conforming and non-conforming hospital groups separately. The resulting R^2s were then examined on a pairwise basis, assessing whether the variation in each independent variable could be explained to roughly the same degree by other independent variables for the conforming and non-conforming groups. An analysis of the R^2s and the F-tests used to compare the multiple correlations in this manner indicated both statistically significant and substantially meaningful discrepancies between the correlation structure of the independent variable sets for the conforming and non-conforming hospitals. Consequently, it was necessary to apply two different prediction methods for the conforming and nonconforming hospitals.

(e) The general discriminant function and regression procedures described earlier were applied to conforming hospitals in both Group 1 and Group 2. One possibility for the non-conforming hospitals

was to simply select a certain percentage of them, based on project experience, for example, as admitting hospitals and then apply the mean ratio of swing-bed to acute care days encountered in the experiments to the acute care days of each admitting hospital, thereby estimating total swing-bed days for each non-conforming hospital simply on the basis of the observed mean for the experimental hospitals. The major difficulty associated with this alternative is the strong relationship between acute care occupancy and swing-bed utilization observed in the experimental hospitals. Consequently, although it was not possible to adjust for a large number of independent variables as was the case for the conforming hospitals in both Groups 1 and 2, an approximate method was developed to adjust for the relationship between acute care occupancy and swing-bed utilization which was observed in the experiment and would be expected in a national program as well.

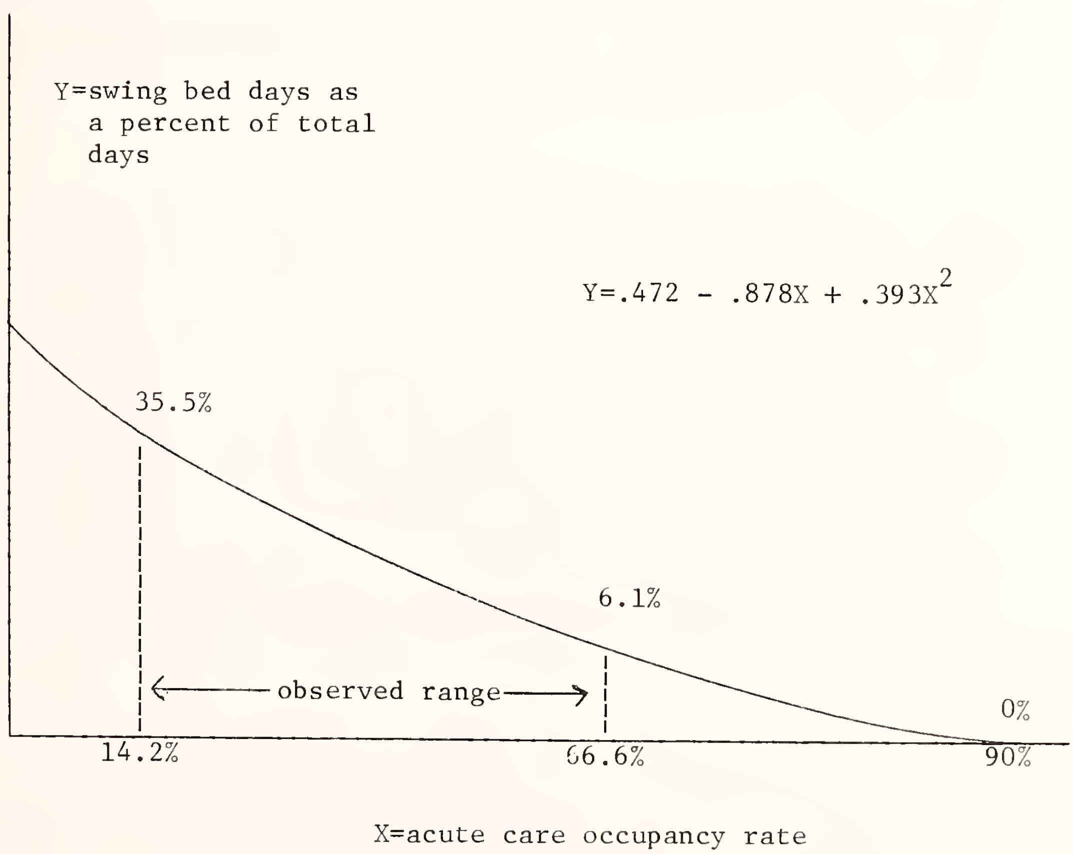
(f) The occupancy rate adjustment for non-conforming hospitals is based on two considerations. First, it is designed to preserve the relationship between swing-bed utilization and acute care occupancy observed empirically in the study hospitals. Second, since no study hospital had an occupancy rate greater than 66.6%, it is designed to adjust for a conceptually postulated relationship between occupancy and swing-bed utilization in the range from 66.6% to 100%. In view of the second order relationship observed empirically and the likelihood of an even stronger second order relationship if the occupancy rate of some experimental hospitals had been higher, a second order polynominal (i.e., quadratic) was fitted to the data over the observed range for occupancy rates (14.2% to 66.6%). Then, based on the premise that as a hospital's occupancy rate approaches 90% (there are very few such rural hospitals) the likelihood of its utilizing a swing-bed program approaches zero, the second order function expressing swing-bed utilization in terms of acute care occupancy rate was assumed to pass through zero at an occupancy of 90%. In order to preserve (approximately) the empirical relationship within the observed range for occupancy rate, the final quadratic function was estimated under the assumption that it must pass through three points: (1) the predicted value (35.5%) for percent swing-bed days obtained by fitting a second order polynomial to the data on the experimental hospitals--at the lowest observed occupancy of 14.2%, (2) the predicted value (6.1%) for percent swing-bed days obtained from the same second order polynomial as in (1)--at the highest observed occupancy of 66.6%, and (3) a value of zero for swing-bed utilization at an occupancy rate of 90%. The resulting function is pictured in Figure IV.1.

(g) For non-conforming hospitals, whether in Group 1 or Group 2, the prediction procedure entailed the following steps. First, since 62% of the swing-bed hospitals admitted patients in 1978, each hospital in the national sample was selected as an admitting hospital with probability 62%. Thus, each non-conforming hospital

in the national sample had a 62% chance of being selected as an admitting hospital. As mentioned above, for the conforming hospitals, this process was not random, rather it was based on the hospital level characteristics which appeared in the discriminant function. However, this was not possible with the non-conforming hospitals since the interrelationships among such characteristics differed substantially from the interrelationships for the conforming hospitals. If a non-conforming hospital was selected as an admitting hospital, swing-bed utilization was predicted using the acute care occupancy rate adjustment mentioned above. This resulted in a predicted percentage of swing-bed days which in turn was transformed by an algebraic adjustment to predicted swing-bed patient days.

FIGURE IV.1:

Swing-Bed Utilization as a Function of Acute Care Occupancy Rate: Function Used to Predict Swing-Bed Utilization for Non-Conforming Hospitals.



(h) After the predicted values were obtained for conforming and non-conforming hospitals in both groups, 99% prediction intervals for the predicted mean number of days were obtained for each of the four groups (i.e., the conforming and non-conforming hospitals within Group 1 and Group 2). These prediction intervals were then used to construct overall prediction intervals for Group 1 and Group 2 separately. The prediction intervals for Group 1 and Group 2 were then used to construct a lower bound and an upper bound for total utilization in the manner indicated in the discussion on the prediction findings presented in Section D.

D. FINDINGS

1. Project Utilization

Data presented in this section pertain primarily to hospitals which actually admitted patients ("used the project") in 1976, 1977 or 1978. In some analyses, however, utilization statistics for the study hospitals which did not admit patients are presented for comparison purposes. Sixty-one (74.4%) of the 82 participating hospitals admitted swing-bed patients in either 1976, 1977, or 1978. Comparisons by project indicate that 21 of the 39 hospitals in the Texas project, 19 of the 21 hospitals in the western Iowa/South Dakota project, and 21 of the 22 hospitals in the central Iowa project admitted swing-bed patients by 1978.

Table IV.2 presents data on swing-bed days in the project states. Since both the RACC projects and the central Iowa project began in mid-year, patient days for 1976 for Texas, South Dakota, and western Iowa, and for 1977 for central Iowa, represent less than a year of project use. During the time period of the experiment, average patient days increased overall and for each project individually. In Texas, while the mean number of days increased between 1977 and 1978, total days for the project declined since the number of admitting hospitals was fewer in 1978. Because one hospital bed can be used to provide 365 days of patient care, by 1978 the swing-bed project in central Iowa and western Iowa generated enough utilization so that an average of 1.5 beds per hospital were occupied by project patients throughout the year. Swing-bed patient days accounted for an average of 3.2 beds a year in South Dakota in 1978 and .8 beds a year in Texas. For all three years of the project, hospitals in South Dakota recorded the highest utilization.

Table IV.3 indicates that project utilization across the three states varied according to the provision of different levels of long-term care. While the predominant type of care provided in the swing-bed experiments was at the skilled level in 1977, skilled and intermediate care were provided with approximately equal frequency by 1978. South Dakota hospitals provided substantially more intermediate care while western and central Iowa hospitals provided about the same amount of

TABLE IV.2:

Swing-Bed Project Patient Days for All Payers by State: 1976, 1977 and 1978.[1]

	Texas	South Dakota	Western Iowa	Central Iowa[2]	Total
1976					
Total Days	1908.0	1002.0	203.0	--	3113.0
Mean per Hospital (p=.896)[3]	238.5	334.0	203.0	--	259.4
St. Dev.	346.3	229.7	0.0	--	296.7
No. of admitting hospitals	8	3	1	--	12
1977					
Total Days	5016.0	9936.0	1572.0	1091.0	17615.0
Mean per Hospital (p=.030)[3]	264.0	709.7	262.0	218.2	400.5
St. Dev.	279.9	695.9	146.6	199.4	481.0
No. of Admitting hospitals	19	14	6	5	44
1978					
Total Days	4121.0	11806.0	3434.0	11471.0	30832.0
Mean per Hospital (p=.007)[3]	294.4	1180.6	572.3	546.2	604.5
St. Dev.	319.3	1016.5	529.4	465.6	649.7
No. of Admitting hospitals	14	10	6	21	51

[1]A swing-bed project patient day is defined as a day of long-term care provided in an acute care bed as part of the swing-bed experiments.

[2]Hospitals in the Iowa Swing Bed Project did not begin admitting patients until June 1977.

[3]Value is the exact p-value, or significance level, for the one-way analysis of variance F-test for the hypothesis of equal means.

Source: Medicare Cost Reports

skilled and intermediate care in 1978. On the other hand, since participating hospitals only reported skilled level days and the administering agency did not monitor any other long-term care days, all Texas project days were at the skilled level. There is not a statistically significant difference, however, across the four regions in terms of average skilled level swing-bed days per hospital for 1978.[2] During

TABLE IV.3:

Percentage of Swing-Bed Project Patient Days for All Payers by State and Level of Care: 1977 and 1978.

State	Level of Care	1977 N	1977 %	1978 N	1978 %
Texas	Skilled	5016	100.0	4121	100.0
	Intermediate	0	0.0	0	0.0
	Personal	0	0.0	0	0.0
South Dakota	Skilled	3825	38.5	3424	29.0
	Intermediate	3786	31.1	5620	47.6
	Personal	2325	23.4	2762	23.4
Western Iowa	Skilled	1083	68.9	1878	54.7
	Intermediate	489	31.1	1556	45.3
	Personal	0	0.0	0	0.0
Central Iowa	Skilled	436	40.0	6022	52.5
	Intermediate	655	60.0	5449	47.5
	Personal	0	0.0	0	0.0
Total	Skilled	10360	58.8	15445	50.1
	Intermediate	4930	28.0	12625	41.0
	Personal	2325	13.2	2762	8.9

Source: Quarterly Reports from Blue Cross of Western Iowa and South Dakota, Texas Hospital Association, and Blue Cross of Iowa

[2]The exact significance level for the analysis of variance F-test is .435.

this year, the mean number of skilled level patient days in 1978 was 292 in South Dakota, 167 in Texas, 265 in western Iowa, and 228 in central Iowa. South Dakota hospitals accounted for the only personal care days recorded for the experiments. Since personal care days are not reimbursed by Medicare or Medicaid, individuals receiving only custodial or residential services are private-pay patients not subject to any external utilization review procedures. Therefore, although personal care days are regarded as swing-bed days in this evaluation, it is conceivable that such patients might have received personal care in rural hospitals even in the absence of a swing-bed program. In fact, this may even be true of intermediate and skilled days for private payers. Conversations on this topic with individuals in the administering agencies provided some evidence (much of it anecdotal in nature) that this may be the case. However, it also appears that the presence of a swing-bed program substantially increases the likelihood that participating patients will receive long-term care in the local community hospital.

Table IV.4 presents swing-bed days by payer. In both years, the predominant source of payment for total project days was private pay. As will be discussed in Chapter VI, there was virtually no Blue Cross or commercial insurance used to pay for swing-bed care in the experiments. Private pay is thus equivalent to self-pay (payment by patients or their families). Medicaid accounted for less than 4% of the payment for swing-bed days in South Dakota in 1977 and for approximately 8% in 1978. As indicated in Table IV.4, swing-bed days reimbursed by the Medicaid program in Texas in 1978 were minimal. Hospital administrators in that state expressed concern about providing care to Medicaid patients who typically have longer lengths of stay than Medicare patients. This reinforces the notion that the swing-bed project in Texas was perceived by administrators as intended primarily for the shorter-term skilled level patient.

This pattern of payment for swing-bed utilization is different from the typical nursing home situation. For example, data from the 1977 National Nursing Home Survey (National Center for Health Statistics 1979) indicate that in 1976 approximately 60% of nursing home days were financed totally or partially by the Medicaid program. On the national level, Medicaid skilled level days accounted for 22.5% and Medicaid intermediate level days for 37.2% of total resident days. Medicare financed days of care were only 2.4% of the national total. The difference between the nursing home and swing-bed experience is due primarily to the predominance of Medicare skilled nursing care in the project, the lack of Medicaid reimbursement in Iowa, and the minimal amount of Medicaid reimbursement in Texas.

Table IV.5 contains selected hospital utilization statistics for 1977 and 1978 which provide some insight into the influence of the swing-bed program on the experimental hospitals. The mean number of days provided in 1977 and 1978 are repeated from Table IV.2. On the average, swing-bed hospitals generally had low acute caae occupancy rates in 1977 and

TABLE IV.4:

Swing-Bed Project Days by State and Payer: 1977 and 1978.[1]

State	Payer	1977 N	1977 %	1978 N	1978 %
Texas	Medicare	3135	62.5	2576	62.5
	Medicaid[2]	--	--	4	0.1
	Private Pay	1881	37.5	1541	37.4
South Dakota	Medicare	3180	32.0	2739	23.2
	Medicaid[2]	328	3.3	909	7.7
	Private Pay	6428	64.7	8158	69.1
Western Iowa	Medicare	681	43.3	1758	51.2
	Medicaid[2]	--	--	--	--
	Private Pay	891	56.7	1676	42.9
Central Iowa	Medicare	435	39.9	4692	40.9
	Medicaid[2]	--	--	--	--
	Private Pay	656	60.1	6779	59.1
Total	Medicare	7449	42.2	11285	36.6
	Medicaid	335	1.9	956	3.1
	Private Pay	9831	59.9	18591	60.3

[1]Percentages were calculated by summing swing-bed days by payer in each state and dividing by the sum of swing-bed days for all payers.

[2]Medicaid participation varied in the three states. In South Dakota, Medicaid reimbursed for skilled and intermediate level swing-bed days beginning in 1977. In Texas, Medicaid did not reimburse for swing-bed care in either 1976 or 1977 but in 1978 did reimburse for skilled level care. The Iowa Medicaid program did not reimburse for swing-bed care in any year.

Source: Medicare Cost Reports

TABLE IV.5:

Selected Utilization Statistics for Project Hospitals Admitting Swing-Bed Patients in 1977 and 1978.

	Average Swing-Bed Days[1]	Average Acute Care Occupancy[2]	Average Total Occupancy[3]	Average Beds[4]
1977				
Texas	264.0 (19)	41.9%	44.2%	35.6
South Dakota	709.7 (14)	39.7%	46.9%	33.5
Western Iowa	262.0 (6)	38.0%	40.7%	31.8
Total	415.6 (39)	40.5%	44.7%	34.3
1978				
Texas	294.4 (14)	43.7%	46.5%	35.9
South Dakota	1180.6 (10)	37.5%	49.1%	34.0
Western Iowa	572.3 (6)	40.2%	47.0%	31.3
Central Iowa	546.2 (21)	37.5%	41.4%	42.9
Total	604.5 (51)	39.5%	45.0%	37.9

[1]The numbers in parentheses are the number of admitting hospitals in each year for which audited cost report data were available. Since central Iowa hospitals did not admit swing-bed patients until mid-1977, they are excluded from this analysis for 1977.

[2]Acute care occupancy is defined as the sum of acute care and special care unit patient days divided by the sum of acute care and special care unit bed-days available.

[3]Total hospital occupancy is defined as the sum of acute care, special care unit, and swing-bed patient days divided by the sum of acute care and special care unit bed-days available.

[4]Average number of beds includes general service and special care unit beds.

Source: Medicare Cost Reports

1978. The provision of swing-bed care added four percentage points to hospital occupancy rates in 1977 and 5.5 points in 1978, with hospitals in South Dakota experiencing increases of slightly more than seven and eleven percentage points, respectively, in the two years.

While acute care occupancy rates declined between 1977 and 1978, total occupancy rates increased slightly due to the provision of swing-bed care. However, the increase in total hospital occupancy for hospitals providing a large amount of swing-bed care was substantial. For example, the hospital providing 2,251 days of care in 1977 (the highest utilization in the experiments in that year) added 23 percentage points to its total occupancy rate (from 25% to 48%) because of the program. In 1978 that same facility added 37 percentage points, increasing its occupancy rate from 25% to 62%.

While there were no major impacts upon average acute and total hospital occupancy, acute care occupancy rates were inversely related to swing-bed utilization, as indicated by the negative correlation between acute care occupancy rate and the number of swing-bed days for admitting hospitals in both 1977 ($r=-.35$, $p=.016$) and 1978 ($r=-.41$, $p=.001$). That is, hospitals with lower occupancy rates tended to provide more long-term care than those with higher occupancy rates.

Table IV.6 presents information on mean length of stay by level of care for swing-bed patients in 1977 and 1978. While patients in swing-bed hospitals in all three states have comparable lengths of stay at the skilled level, there is a considerable difference between South Dakota and Iowa in terms of intermediate care length of stay. Length of stay at the skilled level varied from approximately 18 days to 25 days in 1977 and between 16 days to 23 days in 1978. Data available from the National Nursing Home Survey (National Center for Health Statistics 1979) indicate that the median stay in skilled nursing facilities certified by both Medicare and Medicaid was 35 days in 1976. It was not possible to compute median length of stay for swing-bed patients due to the way data were reported, nor was it possible to test for significant differences between the national estimates and the swing-bed estimates. However, assuming that the average length of stay may have been slightly higher than the reported median figure of 35 (i.e., the median is less sensitive to extreme values than the mean), it appears that length of stay at the skilled level in swing-bed hospitals (including Medicare, Medicaid, and private patients) is significantly lower than that observed in the nursing survey.

In the three projects where hospitals provided intermediate level care, length of stay varied from approximately 23 days to 69 days in 1978. Data reported in the survey cited above indicate that median length of stay in nursing homes certified only to provide intermediate level of care was 176 days in 1976. Again, it was not possible to make exact comparisons between the two groups but it appears that stays at the intermediate level in swing-bed hospitals were shorter than those typically occurring at an intermediate care facility. This is due in large

TABLE IV.6:

Mean Length of Stay for Swing-Bed Patients by State and Level of Care: 1977 and 1978.

	1977		1978	
State	Mean Length of Stay[1]	No. of Admissions	Mean Length of Stay[1]	No. of Admissions
Texas				
Skilled	25.4	197	28.0	147
South Dakota				
Skilled	18.5	189	22.5	152
Intermediate	62.5	65	69.4	81
Personal	87.6	28	172.6	16
Western Iowa				
Skilled	17.5	37	22.1	85
Intermediate	14.6	33	38.9	40
Central Iowa[2]				
Skilled	--	--	16.5	366
Intermediate	--	--	23.4	233
Total				
Skilled	23.5	423	20.6	750
Intermediate	43.6	98	35.7	354
Personal	87.6	28	172.6	16

[1]Mean length of stay was calculated by dividing swing-bed patient days for each level of care by swing-bed admissions for each level of care. Data were obtained from the Quarterly Reports which contained data by level of care not available in the Medicare Cost Reports.

[2]Central Iowa hospitals did not begin to admit swing-bed patients until June 1977 and were therefore excluded from this analysis for 1977.

Source: Quarterly Reports from Blue Cross of Western Iowa and South Dakota, Texas Hospital Association, and Blue Cross of Iowa

part to the absence of the longer-stay Medicaid patients in two of three states. In South Dakota, Medicaid did reimburse for care at the intermediate level, and length of stay in that state was almost twice as long as that observed in the Iowa projects. Finally, as discussed above, South Dakota hospitals reported the only personal care days in the experiments with lengths of stay at that level considerably greater than at the skilled or intermediate level.

Overall, it appears that lengths of stay in the experimental programs tended to be shorter than lengths of stay for the same level of care in nursing homes. This was very likely due to the large amount of Medicare skilled nursing care provided, the absence of the longer-stay Medicaid patient in Texas and Iowa, and the short-term nature of the experimental program itself. Also, conversations with some administrators have indicated that their use of the swing-bed option was primarily to "hold" long-term care patients pending the availability of a local nursing home bed, and when such a bed was available, they preferred transferring the patient. However, as indicated by the length of stay associated with the personal care days in South Dakota, some swing-bed hospitals were willing to take patients with longer stays.

2. Substitution Analysis Findings

The substitution analysis was intended to investigate the possibility that swing-bed utilization represented a shift in demand from either (1) acute care in swing-bed hospitals or (2) existing nursing homes, rather than an unmet demand for long-term care. Prior to the swing-bed programs, it was hypothesized that the option of providing long-term care within a hospital could lead to an earlier and more appropriate reclassification of patients from acute to long-term care, thereby resulting in a decreased acute care length of stay. Table IV.7 presents a comparison of acute care length of stay between 1975 and 1977 for hospitals providing swing-bed care in 1977 (not including central Iowa hospitals) and between 1975 and 1978 for hospitals providing care in 1978. As indicated, there is a statistically significant decline in acute care length of stay for swing-bed hospitals over both periods. However, average acute care length of stay also declined significantly in the comparison hospitals over the same time periods. Further, the difference in the change in acute care length of stay between project and comparison hospitals is not significant between 1975 and 1977. The difference is significant between 1975 and 1978 with the larger decrease observed in project hospitals, indicating that the decline observed in project hospitals was greater than that in the comparison facilities. The 1975 to 1978 difference is also more significant due to a larger sample size, i.e., there were more admitting hospitals in 1978. Nevertheless, these results suggest that some acute care substitution may have taken place.

In addition to an examination of acute care length of stay, survey data were analyzed in an attempt to ascertain whether swing-bed hospitals were classifying acute care patients more quickly into long-term care status, thus decreasing acute care length of stay. As

TABLE IV.7:

Changes in Acute Care Length of Stay for Admitting Project and Comparison Hospitals: 1975 to 1978.

	Average Acute Care Length of Stay					
	1975	1977	Change	1975	1978	Change
Admitting project hospitals[1]	6.31	5.76	.55	6.71	5.64	1.07
Comparison hospitals	6.00	5.74	.36	6.08	5.69	.39

	Significance Levels for Statistical Differences Between:[2]	
	1975 and 1977	1975 and 1978
Admitting project hospitals[1]	<.001	<.001
Comparison hospitals	.013	.005

	Significance Levels for Statistical Tests of Differences in Change in Length of Stay Between:[2]	
	1975 and 1977	1975 and 1978
For admitting vs. comparison hospitals	.268	.006

[1]Length of stay for project hospitals for the 1975/1977 analyses was calculated using only hospitals admitting swing-bed patients in 1977. For the 1975/1978 analyses, only hospitals admitting swing-bed patients in 1978 were included. Since hospitals in central Iowa did not begin admitting swing-bed patients until mid-1977, both they and their associated matched comparison hospitals were excluded from the 1975/1977 analysis.

[2]Value is the exact p-value, or significance level, associated with the two-sample t-test for mean differences.

Source: Medicare Cost Reports

part of the Follow-Up Provider Survey, administrators in the three states were asked if their hospital had been reimbursed by Medicare for "administratively necessary days" prior to the swing-bed project.[3] Among the group of administrators whose hospitals had admitted swing-bed patients, slightly more than 70% indicated that they had not used this Medicare option previously. This suggests that prior to the program, Medicare was paying for relatively little long-term care at acute care rates in the experimental hospitals. Conversations with the fiscal intermediaries indicate that administrators in these hospitals were reluctant to use the option because of their fear of being denied payment after care had been provided.

As part of the Provider Survey, administrators were asked where patients who were receiving care under the swing-bed program (up to the time of the interview, Spring 1978) would have received care in the absence of the experiment. Slightly less than 20% of the respondents indicated that some of their patients would have been kept as acute care patients.

As indicated in Table IV.8, mean acute care occupancy rate for hospitals admitting swing-bed patients in 1977 (not including hospitals in central Iowa) declined from 43.3% in 1975 to 40.5% in 1977. For hospitals admitting patients in 1978, mean acute care occupancy rate declined from 45.0% in 1975 to 40.1% in 1978. Both of these decreases are statistically significant. However, it appears that this decrease in acute care occupancy was simply in keeping with a general trend in such hospitals. Acute care occupancy declined significantly in the comparison hospitals over the same time periods. Unlike length of stay, the difference in the <u>change</u> in acute care occupancy between project and comparison hospitals is also not significant over these time periods.

Overall, it is difficult to assess the impact of the swing-bed experimental program on acute care utilization in project hospitals. In general, it appears that hospitals utilizing the swing-bed experiment had declining acute care utilization due to factors other than the swing-bed experiments. Also, the amount of long-term care utilization experienced in 1977 and 1978 as a result of the experiments was, on the average, slight and thus the impact on acute care utilization within the swing-bed hospitals appears to have been minimal. However, there is some evidence to suggest that acute care length of stay may have decreased as a result of the provision of swing-bed care in project hospitals.

In terms of the impact of the swing-bed experiments on nursing home utilization, the findings presented here are based on South Dakota,

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[3]As discussed earlier, these are days of care paid at acute care rates by Medicare because a certified SNF bed is not available and the patient must be kept in the acute care facility.

TABLE IV.8:

Changes in Acute Care Occupancy Rates for Admitting Project and Comparison Hospitals: 1975 to 1978.

	Average Acute Care Occupancy[1]					
	1975	1977	Change	1975	1978	Change
Admitting project hospital[1]	43.3%	40.5%	2.8%	45.0%	40.1%	4.9%
Comparison hospitals	51.3%	48.2%	3.1%	51.1%	47.8%	3.3%

	Significance Levels for Statistical Test of Difference Between:[2]	
	1975 and 1977	1975 and 1978
Admitting project hospitals[1]	.048	<.001
Comparison hospitals	.002	.001

	Significance Levels for Statistical Test of Differences in Change in Occupancy Between:[2]	
	1975 and 1977	1975 and 1978
For admitting vs. comparison hospitals	.159	.133

[1]Length of stay for project hospitals for the 1975/1977 analyses was calculated using only hospitals admitting swing-bed patients in 1977. For the 1975/1978 analyses, only hospitals admitting swing-bed patients in 1978 were included. Since hospitals in central Iowa did not begin admitting swing-bed patients until mid 1977, both they and their associated matched comparison hospitals were excluded from the 1975/1977 analysis.

[2]Value is the exact p-value, or significance level, associated with the two-sample t-test for mean differences.

Source: Medicare Cost Reports

the state with the highest number of swing-bed days in 1977. On a per capita basis, long-term care days per Medicare enrollee (including swing-bed days in 1977) increased in project counties from 35.5 in 1975 to 36.3 in 1977, an increase of 3%. Over the same time period, occupancy rates in existing nursing homes located in these counties increased from 95.4% to 96.7%. This increase in occupancy rates took place despite an increase of 41 new nursing home beds in project counties. At the same time, swing-bed hospitals in these counties provided 9,936 days of long-term care in 1977, approximately 2% of all long-term care days in the state that year.

The overall increase in long-term care utilization in the rural swing-bed counties in South Dakota and the fact that rural nursing home occupancy rates appear to have been unaffected by the availability of hospital swing beds suggest that no substitution of swing-bed care for nursing home care took place as a result of the experiments.

3. Correlates of Utilization and Prediction Analyses Findings

The findings in this section are presented in two parts. First, results of the logistic and multiple regression analyses are presented which identified factors related to (a) the decision of participating hospitals to admit swing-bed patients and (b) the extent of variation in swing-bed utilization in 1978. In addition to these results, the responses which hospital administrators made to a question on the Provider Survey asking them to indicate the principal factor limiting admission of swing-bed patients are also examined. Second, the results of the analyses designed to predict the number of admitting hospitals and swing-bed patient days in the event of a national program are presented.

a. Correlates of Utilization: As discussed in Section B, logistic regression analysis was used to determine the extent to which hospital, project, and community level factors taken together could explain the decision of participating hospitals to admit swing-bed patients. Nine different logistic regression functions were estimated, each with different combinations of independent variables in order to assess the relative importance of several factors in a multivariate context and to minimize interpretive problems associated with collinearity. Seven of the nine logistical regressions were significant ($p<.05$, using the overall chi-square statistic associated with the estimated logistic regression function) indicating that the independent variables were able to discriminate significantly between admitting and non-admitting hospitals in seven equations. The chi-square tests for each independent variable (analogous to the t-statistic for individual regression coefficients) indicates which variables contribute significantly to each estimated function.[4]

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[4]The logistic regression results are not tabulated. Rather, the major findings are briefly summarized in narrative form in the paragraph following the sentence which references this footnote.

Two project-related variables were consistently (and significantly) related to the decision to admit swing-bed patients. Administrator acceptance and attendance at orientation (discussed in Chapter III) were positively related to the tendency of hospitals to admit swing-bed patients, suggesting that administrator knowledge about and willingness to use the program is a determinant of the decision to admit swing-bed patients. Two community-level factors were related to admission of swing-bed patients; nursing home occupancy rate in the project county was positively related to the decision to admit swing-bed patients and location in Texas was negatively related to the decision to admit. The nursing home occupancy rate relationship confirms results presented earlier which indicated that swing-bed admissions took place in counties where existing nursing homes tended to have higher occupancy rates, suggesting that swing-bed admissions did not occur in lieu of nursing home admissions. As discussed in Chapter III, Texas hospitals generally tended to admit swing-bed patients less frequently and, in general, a lower percentage of Texas administrators and staff favored the swing-bed approach.

The second set of findings presented in this section pertain to correlates of utilization and focus on hospital and project characteristics which contributed to the overall utilization experience of admitting hospitals. Tables IV.9 and IV.10 present two regression equations with the second consisting of the same set of independent variables as the first, but including two additional dichotomous variables measuring location in South Dakota and central Iowa in order to determine if other factors related to location (i.e., other than the independent variables in the first equation) might further explain the variation in swing-bed utilization. The dependent variable used in both regressions is the percentage of hospital patient days (acute and swing-bed days) which are swing-bed days. Two other dependent variables were examined, the number of swing-bed days in 1978 and swing-bed days per acute care bed. In all cases, regressions with a given set of independent variables had greater explanatory power (i.e., higher R^2s) with percent swing-bed days as the dependent variable than analogous equations with the other two dependent variables. In general, however, the same independent variables tended to be significant regardless of the dependent variables used.

For the two equations presented in Tables IV.9 and IV.10, acute care occupancy rate is significantly and negatively related to the provision of swing-bed days. This negative relationship between acute care occupancy and swing-bed utilization was discussed earlier, using the number of swing-bed days as opposed to the percent of swing-bed days. It confirms the expected negative association between occupancy and swing-bed utilization, a fundamental premise of the entire swing-bed approach.

Cost per day is positively associated with swing-bed utilization in the regression equations. While cost per day is negatively related to occupancy (r=-.60), it is not perfectly correlated and, further, each variable appears in the equation significantly related to the

TABLE IV.9:

Regression Equation with Swing-Bed Days as a Percentage of Total Hospital Days as the Dependent Variable for Admitting Project Hospitals in 1978.

Dependent Variable: Swing-Bed Days as a Percentage of Total Hospital Days

Unit of Analysis: Admitting Hospital

R^2	= .53	Mean of Dependent Variable	= .123
N	= 49	St. Dev. of Dependent Variable	= .149
F	= 12.48 ($p<.001$)	Standard Error	= .106

Independent Variables	Regression Coefficient	Elasticity	Signif. of t	Corr. w/ Dep. Var.
Acute care occupancy rate	-.620	-2.01	.001	-.641
Routine cost per acute care patient day	.002	1.12	.049	.569
Activities program provided[1]	.074	--	.049	.345
Chief of staff would like to see project continued[1]	.071	--	.166	.107
Constant	.151	--	--	--

[1]This is a dichotomous variable with a value of one indicating the presence of the attribute and a value of zero indicating its absence. The elasticity coefficient is not presented since it is dichotomous.

Source: Medicare Cost Reports and Provider Survey

TABLE IV.10

Regression Equation with Swing-Bed Days as a Percentage of Total Hospital Days as the Dependent Variable for Admitting Project Hospitals in 1978, Including Location Variables.

Dependent Variable: Swing-Bed Days as a Percentage of Total Hospital Days

Unit of Analysis: Admitting Hospitals

R^2 = .63	Mean of Dependent Variable = .123
N = 49	St. Dev. of Dependent Variable = .149
F = 12.15 ($p<.001$)	Standard Error = .096

Independent Variables	Regression Coefficient	Elasticity	Signif. of t	Corr. w/ Dep. Var.
Acute care occupancy rate	-.650	-2.12	<.001	-.641
Routine cost per acute care patient day	.002	1.06	.041	.569
Activities program provided[1]	.074	--	.032	.345
Chief of staff would like to see project continued[1]	.099	--	.038	.107
South Dakota[1]	.079	--	.052	.338
Central Iowa[1]	-.523	--	.108	-.099
Constant	.151	--	--	--

[1]This is a dichotomous variable, with a value of one indicating the presence of the attribute and a value of zero indicating its absence. The elasticity coefficient is not presented since it is dichotomous.

Source: Medicare Cost Reports and Provider Survey

dependent variable with the same sign as its ordinary correlation coefficient with the dependent variable. Therefore, it appears that a factor separate from occupancy is operating in this instance. One probable explanation is that hospitals with a broader service mix and, consequently, a higher cost structure in general, were more interested in providing swing-bed care. In concept, a broader service mix would also speak to the potential for higher quality of care. As discussed in Chapter V, this line of reasoning is partially confirmed by the fact that hospitals with higher cost per day also provided higher quality care.

The equations also indicate a positive association between the presence of a patient activities program and swing-bed utilization, highlighting the potential importance of this type of program for swing-bed patients. As will be discussed in Chapter V, this relationship has further bearing on quality assurance considerations for swing-bed hospitals. Finally, there is a positive association between a preference expressed by the chief of staff for the hospital to continue participating in the program and the percentage of swing-bed days provided. The role of the physician in explaining acceptance has already been discussed in Chapter III.

The inclusion of the two variables measuring location in either South Dakota or central Iowa adds approximately ten percentage points to the overall ability of the regression equation to explain variation in project utilization. These variables point to the state level differences in utilization discussed earlier in this chapter.

The final analysis on correlates of utilization is an examination of the responses which hospital administrators made to a question on the Provider Survey asking them to indicate the principal factor limiting admission of swing-bed patients to their hospitals. Five factors, listed in order of frequency of occurrence, account for over 70% of the reasons given by hospital administrators for limiting admission of swing-bed patients: the reluctance of physicians to admit swing-bed patients (23% of the administrators), low demand by community residents (17%), the presence of long-term care facilities in the service area of the hospital (13%), the lack of transfers of long-term care patients from other facilities (9%), and utilization limits imposed by the experimental agreements (9%).

Comparisons by project indicated significant differences across the projects in the factors limiting admission of swing-bed patients. Administrators of hospitals in western Iowa/South Dakota were significantly more likely than administrators of hospitals in Texas and central Iowa to report that long-term care facilities in their service areas and the lack of transfers of long-term care patients from other facilities limited their admission of swing-bed patients ($p=.088$ and $p=.013$, respectively, using Fisher's Exact Test). Administrators of hospitals in western Iowa/South Dakota and central Iowa which had the highest utilization experience are significantly more likely than administrators in Texas to report utilization near the maximum allowed

by the experiments (p=.012 using Fisher's Exact Test).

A comparison of admitting and non-admitting hospitals in terms of the principal factors limiting admission of swing-bed patients indicates that the only factors on which admitting and non-admitting hospitals are significantly different were inadequate reimbursement to hospitals and high or variable acute care occupancy. Neither of these were among the five most commonly cited factors. One (1.7%) of the 60 administrators from admitting hospitals reported inadequate reimbursement as the principal limiting factor, whereas three (15.8%) of the 18 administrators of the non-admitting hospitals reported inadequate reimbursement as their principal limiting factor. Three (15.8%) of the 18 administrators in non-admitting hospitals (and nine in admitting hospitals) mentioned high or variable acute care occupancy rate as a limiting factor. Two of the administrators in non-admitting hospitals indicated they had agreed to participate in the experiments when occupancy rates were low. However, in each case an additional admitting physician was added to the hospital and acute care occupancy rates improved to a degree that they were no longer interested in the project.

b. Prediction Analysis: Tables IV.11 and IV.12 present the discriminant function and regression equation used in predicting whether a hospital would admit swing-bed patients and the percent swing-bed days which would be provided by admitting hospitals, respectively. The discriminant function and regression equation are based on 1978 data for project hospitals. These two functions were derived on the basis of the logistic and ordinary least squares regression results presented in the preceding section on correlates of utilization.

Since data obtained from the Provider Survey and Medicare Cost Reports were not available for hospitals in the national sample, it was necessary to use other data sources in estimating the final predictive formulas on the project hospitals. That is, in the development of the final predictive formulas it was judged more appropriate to use the data base to which the formula would ultimately be applied for prediction purposes. Although it was possible to attain more explanatory power with the independent variables appearing in Tables IV.9 and IV.10 by using the Medicare Cost Reports and Provider Survey data, other types of prediction biases might enter into the final results if such equations were then applied using data from other sources for forecasting purposes. Thus, certain independent variables in the equation in Table IV.10, such as acute care occupancy rate, are not related to swing-bed care utilization as strongly as in the regression equations of Tables IV.11 and IV.12. This very likely is due to the greater accuracy of occupancy rates reported on the (audited) Medicare Cost Reports.

An assessment of the R^2s associated with Tables IV.10 and IV.12 indicates that the explanatory power associated with the independent variables which appear in Table IV.10 is approximately 20% higher than those which appear in Table IV.12. The reason for this is twofold.

TABLE IV.11:

Discriminant Function Used to Classify Admitting and Non-Admitting Hospitals for a National Swing-Bed Program.

Groups

Group A - Project hospitals admitting swing-bed patients (N=51)
Group B - Project hospitals not admitting swing-bed patients (N=31)

Discriminant Function

Squared canonical correlation	= .208
Wilk's lambda	= .792
Chi-square	= 16.76 ($p<.001$)
Percentage of cases correctly classified	= 69.7%

Independent Variables	Standardized Coefficients	Classification Coefficients Group A	Classification Coefficients Group B
County nursing home occupancy (1976)	.762	83.90	76.11
County hospital beds per 1,000 population (1975)	.183	.16	.15
RNs per inpatient day (adjusted to include outpatient visits) (1977)[1]	.810	.32	-3.58
Employees per inpatient day (adjusted to include outpatient visits) (1977)[1]	-.998	2.20	3.55
Constant term	--	-46.90	-42.40

[1]Inpatient days as reported in the 1977 AHA Survey included outpatient visits which were converted into equivalent inpatient days.

Source: American Hospital Association (AHA) Hospital Survey (1977), County and City Data Book (1977), and the Master Facility Inventory Survey (NCHS)(1976)

TABLE IV.12:

Regression Analysis Predicting Swing-Bed Patient Days for Admitting Project Hospitals in 1978.

Dependent Variable: Swing-Bed Patient Days as a Percent of Total Hospital Days in 1978

Unit of Analysis: Admitting Hospital

R^2 = .41	Mean of Dependent Variable = .123
N = 51	St. Dev. of Dependent Variable = .148
F = 5.02 (p=.001)	Standard Error = .122

Independent Variables	Regression Coefficient	Elasticity	Signif. of t	Corr. w/ Dep. Var.
Expenses per inpatient day (adjusted for outpatient visits)(1977)[1]	-.001	-1.35	.007	-.267
Acute care occupancy rate (1977)	-.376	-1.30	.030	-.430
Ratio of outpatient visits to acute care beds (1977)	-.001	-.25	.304	-.061
County nursing home occupancy rate (1976)	.079	.60	.753	.214
RNs per inpatient day (adjusted for outpatient visits) (1977)[1]	.318	1.37	.002	.342
Presence of hospital long-term care unit (1977)[2]	.029	--	.605	.189
Constant	.230	--	--	--

[1]Inpatient days as reported in the 1977 AHA Hospital Survey included outpatient visits which were converted into equivalent inpatient days.

[2]This is a dichotomous variable with a value of one indicating the presence of a long-term care unit and a value of zero indicating its absence. The elasticity coefficient is not presented since it is dichotomous.

Source: American Hospital Association (AHA) Hospital Survey 1977, County and City Data Book (1977), and the Master Facility Inventory Survey (NCHS)(1976)

First, certain locational and project level variables could not be used for prediction purposes in Table IV.12. Second, as mentioned above, the greater accuracy associated with data sources available for only the project hospitals tends to increase the explanatory power of the earlier regression equations.

Section C.4 contains a discussion of the methodology associated with the prediction findings presented here. It is assumed that the reader is familiar with this discussion, including the definitions of Groups 1 and 2, as well as the meaning of conforming and non-conforming hospitals. Table IV.13 presents the ranges for project hospitals and hospitals in the national sample associated with all variables in either the discriminant function or regression equation presented in Tables IV.11 and IV.12, respectively. Thus, non-conforming hospitals consist of those for which at least one independent variable had a value outside the range indicated in the first column in Table IV.13. In all, 32.9% of the Group 1 sample hospitals and 19.1% of the Group 2 sample hospitals were non-conforming.

Using the procedure discussed earlier, combining the prediction intervals for conforming and non-conforming within each group, an approximate 99% prediction interval for the Group 1 hospitals throughout the nation ranges from 1,301,075 swing-bed days to 1,970,914 swing-bed days in 1978. The analogous interval for Group 2 hospitals is 749,800 days to 1,304,599 days. Combining these prediction limits in the manner discussed earlier yields an overall prediction interval consisting of values between 749,800 days and 1,970,914 days of long-term care which would have been provided in 1978 under the assumptions that (a) all hospitals in non-SMSA counties would be eligible to participate, (b) that hospitals in counties with average nursing home occupancy rates less than 80% would not participate, and (c) that the utilization patterns observed for project hospitals are reasonably representative of swing-bed utilization which would take place nationally.

4. Summary of Findings

(1) By 1978, 51 rural hospitals were providing long-term care under the swing-bed experiments in Texas, Iowa, and South Dakota, accounting for about 30,800 days of care in that year. Hospitals admitting swing-bed patients in 1978 averaged approximately 605 long-term care days per facility. The average number of days per admitting hospital differed substantially by location, with South Dakota hospitals averaging approximately 1,180 long-term care days, western and central Iowa hospitals averaging about 550 days, and Texas hospitals providing slightly less than an average of 300 long-term care days. In 1978, one swing-bed hospital provided only 8 days of long-term care, while another provided 3,667 days.

(2) In all, Medicare reimbursed for 37%, Medicaid for 3%, and private pay for 60% of the experimental long-term care days in 1978.

TABLE IV.13:

Variables Used in the Prediction of National Swing-Bed Utilization.

Variables	Range of Values for Project Hospitals	Range of Values for Non-Project Hospitals
County nursing home occupancy rate (1976)	70% - 100%	33% - 100%
County hospital beds per 1,000 population (1977)	1.5 - 12.0	.01 - 14.4
Acute care occupancy (1977)	14.2% - 66.6%	10.1% - 100%
Expenses per inpatient day (adjusted for outpatient visits) (1977)[1]	\$38.48 - \$305.18	\$33.67 - \$266.33
Ratio of outpatient visits to acute care beds (1977)	15 - 223	0 - 1160
Presence of hospital long-term care unit (1977)	0 - 1	0 - 1
RNs per inpatient day (adjusted for outpatient visits) (1977)[1]	.15 - .92	.08 - 2.42
Employees per inpatient day (adjusted for outpatient visits) (1977)[1]	1.07 - 6.80	1.10 - 14.20

[1]Outpatient visits were converted into the equivalent of an inpatient day in computing this variable.

Source: American Hospital Association (AHA) Hospital Survey (1977), County and City Data Book (1977), and the Master Facility Inventory Survey (NCHS) (1976)

Medicaid did not reimburse for swing-bed care in Texas or western Iowa in 1977. However, Medicaid did reimburse for skilled level care in Texas in 1978. The payer mix was substantially different between South Dakota and Texas, with Medicare paying for 23% of the long-term care days in South Dakota compared with 63% in Texas. Private pay accounted for 69% of the long-term care days in South Dakota, compared with 37% in Texas. Related to this, Texas hospitals provided only skilled nursing care, central Iowa and western Iowa hospitals provided approximately equal amounts of skilled and intermediate care, and South Dakota hospitals provided all three levels of long-term care. For all hospitals combined, 50%, 41%, and 9% of the swing-bed care days provided were in the categories of skilled, intermediate, and personal care, respectively.

(3) Mean length of stay for swing-bed patients in 1978 varied from 16 days at the skilled level to slightly over 172 days for personal care. Acute care occupancy and the number of days of long-term care provided in hospitals which admitted swing-bed patients in 1978 are negatively correlated. That is, hospitals with lower occupancy rates tended to provide more long-term care than those with higher occupancy rates.

(4) For hospitals admitting swing-bed patients in 1978, hospital acute care occupancy rate was 43.3% in 1975 and 40.1% in 1978. Counting both acute care days and long-term care days provided under the swing-bed experiments, total occupancy rate for these hospitals in 1978 averaged 45.0%, 5.5 percentage points over the acute care occupancy for the same year. Acute care length of stay decreased from 6.71 days in 1975 to 5.64 days in 1978 for the hospitals which provided long-term care under the experiment in 1978. These changes in acute care occupancy and length of stay were paralleled by similar acute care utilization patterns in a group of comparison hospitals. Nonetheless, the decline in acute care length of stay was greater in admitting swing-bed hospitals than in the comparison hospitals, suggesting that some acute care substitution may have taken place.

(5) As is clear from Finding 1, the total amount of long-term care provided in the experimental swing-bed hospitals is relatively small compared with acute care. Similarly, swing-bed hospitals accounted for a very small proportion of total statewide long-term care days (provided predominantly by nursing homes) in 1977. In South Dakota, the state with the most swing-bed days, long-term care provided in swing-bed hospitals accounted for approximately 2% of the total long-term care days provided in 1977.

(6) Long-term care utilization generally increased on a per capita basis between 1975 and 1977. Using South Dakota as an illustration, long-term care days per Medicare enrollee increased in pro-

ject counties by 3%. A slight increase in the occupancy of existing nursing homes from 95% to 97%, the addition of 41 new nursing home beds, and the provision of long-term care by swing-bed hospitals accounted for this increase. The overall increase in long-term care utilization in the rural swing-bed counties, and the fact that rural nursing home occupancy rates appear to have been unaffected by the availability of hospital swing-beds, indicate that virtually no substitution of swing-bed care for nursing home care took place as a result of the experiments.

(7) If a swing-bed program were implemented nationally and all hospitals in rural communities (those not located in SMSAs) were eligible to participate, it is estimated that the between 750,000 and 1,971,000 days of long-term care would be provided in hospital swing-beds, based on the 1978 utilization patterns observed in the western Iowa/South Dakota and Texas swing-bed experiments. This would represent a 0.21% to 0.56% increase in total institutional long-term care utilization nationally.

E. IMPLICATIONS

The following section contains the major implications of the utilization study.

(1) An unmet demand for institutional long-term care exists in many rural communities. The results of this study indicate that the long-term care utilization experience of the swing-bed hospitals was not due to a diversion of long-term care patients from existing nursing homes, but instead represents a demand which previously had not been met. Thus, it appears that many rural communities may be in need of additional long-term care beds. In addition to meeting the needs of rural residents, the availability of swing beds in rural areas reduces travel time and related inconveniences for the families and friends of long-term care patients, thereby increasing the likelihood of a stronger social support system for the long-term care patient.

(2) Findings presented here indicate that acute care length of stay in project hospitals may have decreased as a result of the provision of swing-bed care. Further, recent studies have documented that in many areas of the country, patients remain in acute care status longer than is warranted by their medical condition. For example, a study in New York state in 1979 indicated that on one day almost 4000 hospital patients were awaiting transfer to a long-term care facility and on the average waited 36 days for appropriate placement (New York State PSRO 1979). To the extent that hospitals in rural areas throughout the country face similar situations, the ability to place patients appropriately would be enhanced by the availability of swing beds within the hospital.

(3) The overall impact of the swing-bed program, in terms of patient days of long-term care provided, was not great enough to eliminate the chronic problems associated with underutilized rural hospitals. However, the swing-bed approach does represent one method of rural hospital diversification and, for some hospitals, providing a large number of swing-bed days of care could substantially improve occupancy rates and enhance the long run survival of the hospital.

(4) Since a key element influencing hospital admission of swing-bed patients was physician understanding and willingness to use the swing-bed approach, national implementation of the swing-bed concept should emphasize physician involvement from the beginning. As indicated in Chapter III, physicians should be made aware of the availability of long-term care beds in the hospital as part of an information dissemination program.

(5) Unless a national program specifically limits levels of care provided, it is probable that most participating hositals will provide all levels of long-term care. However, hospitals may choose to care for patients with shorter-term stays than are commonly found in nursing homes. In fact, it is likely that some hospitals may choose to provide long-term care only as a temporary measure and continue to try to place patients in more traditional institutional settings.

(6) It is not possible to precisely forecast utilization which would result from the implementation of a national program since: (1) payers participated to differing degrees across the various experiments; (2) the distribution of patients within different levels of long-term care varied from experiment to experiment; (3) reimbursement procedures differed; (4) administrative practices differed at both the hospital and state levels; and (5) as discussed in Chapter II, hospitals participating in the experiments differed from hospitals in other rural areas on a number of factors. Nevertheless, it is possible to predict utilization within very broad ranges. If the program is implemented in rural areas throughout the country, and if state level certificate of need agencies restrict swing-bed care to those areas where nursing homes do not appear to meet the demand for institutional long-term care, swing-bed utilization is likely to range between 750,000 and 1,970,000 long-term care days per year within one to two years following implementation of the program.

CHAPTER V

QUALITY

A. INTRODUCTION

The quality component of the swing-bed evaluation is intended to assess the quality of long-term care provided in swing-bed hospitals and to recommend quality assurance guidelines for swing-bed care in the event a swing-bed program is implemented nationwide. The primary component of the quality assessment is a comparative analysis of the quality of care provided in swing-bed hospitals and that provided in a sample of nursing homes in the project states. Analyses of patient characteristics and other factors relating to the quality of care in the two facility types is also included.

Section B provides an overview of the quality component, including a general discussion of the experimental conditions and quality measurement techniques. Data sources and analytic procedures used are discussed in Section C. Findings are presented in Section D, and recommendations pertinent to implementation of a nationwide swing-bed program are contained in the final section.

B. OVERVIEW

1. Purpose of the Quality Analysis

Quality assessment is a major focus of this evaluation since the ability of acute care hospitals to deliver quality long-term care should be a necessary condition for implementation of a nationwide swing-bed program. As mentioned in Chapter I, long-term care patients are typically chronically ill, often with multiple diagnoses and/or problems, and are most frequently elderly. Because most training programs for hospital personnel emphasize hospital-based acute care with relatively little emphasis on long-term and geriatric care, the staff of the typical acute care hospital is often unfamiliar with the treatment of long-term care patients. Furthermore, hospitals participating in the experiments were not required to meet certain regulatory standards normally required of long-term care providers. These two factors, i.e., the lack of experience in treating the special problems of the chronically impaired and the waiver of certain regulatory requirements intended to ensure quality in the provision of long-term care, suggest the possibility that swing-bed hospitals might not be adequately prepared to meet the needs of long-term care patients. The recommendations concerning quality assurance presented at the end of this chapter, therefore, are intended to address the potential problem areas identified in the findings of this analysis.

2. Experimental Conditions

Table V.1 lists the Medicare/Medicaid conditions of participation for

skilled nursing facilities (SNFs) which were waived under the experiments. Hospitals and nursing homes are normally required to be in "substantial compliance" with all the conditions of participation in order to receive reimbursement from Medicare and/or Medicaid for the provision of skilled nursing care.[1] Further, hospitals are required to maintain a physically "distinct part" exclusively for the provision of long-term care and establish and maintain separate financial records for the skilled nursing care unit.

Although not required to comply with these conditions, the hospitals participating in the swing-bed experiments did satisfy Medicare and Medicaid acute care regulations (based on standards set by the Joint Commission on Accreditation of Hospitals). Since the acute care regulations overlap with the SNF regulations, Table V.1 also indicates which of the SNF conditions were satisfied by the participating hospitals on the basis of their compliance with acute care standards. This does not mean that the experimental hospitals failed to satisfy the remaining conditions of participation, only that they did not automatically satisfy them by virtue of acute care certification.

Consequently, an assessment of the impact of waiving those SNF conditions of participation directly related to the provision of quality long-term care is included here. The most critical waived standards pertain to specialized rehabilitative services (physical therapy, speech therapy, and occupational therapy); dental services; social services; and patient activities. In addition, other standards waived, such as the requirements for nurse education and training in long-term and rehabilitative care, as well as discharge planning for patients, are also analyzed.

3. Measurement of Quality

To effectively evaluate the quality of care provided in experimental hospitals, it was necessary to establish a basis for comparison. To avoid imposing standards of care that would be unrealistic in rural communities, a group of rural (non-SMSA), Medicare- and/or Medicaid-certified SNFs, located in the same states as the swing-bed hospitals, was selected. A comparison of care provided in the swing-bed hospitals with that provided in these nursing homes constitutes the focus of this evaluation component.

Measures of quality are generally classified using the three group typology originated by Donabedian (1966, 1968) which includes structural, process, and outcome measures of quality. Characteristics of the three types of measures are reviewed below and related to the measures used

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[1]The minimum SNF regulations are identical for both Medicare and Medicaid, although state Medicaid programs have the option of strengthening the federal standards.

TABLE V.1:

Medicare/Medicaid Conditions of Participation for Skilled Nursing Facilities.

CFR Section	Topic	Required of Acute Care Hospitals[1]
405.1120	Compliance with federal, state, and local laws governing skilled nursing facilities	In part
405.1121	Governing body and management Not required: Staff development (includes education and training in long-term care)	In part
405.1122	Medical direction	Yes
405.1123	Physician services	Yes
405.1124	Nursing services Not required: Rehabilitative nursing care	In part
405.1125	Dietetic services	Yes
405.1126	Specialized rehabilitative services (physical therapy, speech pathology and audiology, and occupational therapy)	No
405.1127	Pharmaceutical services	Yes
405.1128	Laboratory and radiologic services	Yes
405.1129	Dental services	No
405.1130	Social services	No
405.1131	Patient activities	No
405.1132	Medical records	Yes
405.1133	Transfer agreement	Yes
405.1134	Physical environment Not required: Dining and patient activity rooms	In part
405.1135	Infection control	Yes
405.1136	Disaster preparedness	Yes
405.1137	Utilization review Not required: Discharge planning	In part

[1]Acute care hospitals are also required to satisfy a number of additional acute care conditions of participation which are not listed here.

Source: Code of Federal Regulations (42 CFR 405.1120 to 405.1137)

to evaluate quality in this study.[2]

Structural measures of quality reflect institutional characteristics such as physical design, governing and management policies, staffing levels and qualifications, and the availability of specific services. Structural factors generally form the basis for institutional regulations for health care facilities, such as the SNF conditions of participation discussed in the previous section, and are intended to produce necessary, but not sufficient, conditions for the delivery of adequate care. The relation between structural characteristics and quality of care actually provided is not clear, however. Studies in this area have examined the relationship between quality of care provided and such structural measures as nursing home ownership, training and experience of personnel, and the number of beds in the nursing home. The results have been inconsistent and, in some cases, contradictory.

Structural measures are used in this study primarily to assess the impact of the waiver of the conditions of participation on the quality of care provided in swing-bed hospitals, and to identify other hospital characteristics which are related to the quality of care.

Process measures entail the assessment of quality in terms of the resources used and procedures performed in the provision of care. While the establishment of quality standards and the collection of data are more difficult than in a structural analysis, the results are more likely to be directly related to a patient's health status. The most prevalent technique for assessing process quality is a comparison of care actually provided with explicit criteria constructed by experts in the patient care field under consideration.

Process quality measures used in this study are based on data derived from interviews with nursing staff and a review of medical records. A multidisciplinary service criteria set was developed for each of 27 problems (including medical, functional, and psychosocial problems) typically found in long-term care patients, specifying the services which should be provided to a patient with a particular problem. The lists of services and accompanying standards for the frequency and provider of each service were developed by a panel of long-term care experts. Data were gathered in swing-bed hospitals and comparison nursing homes to determine the extent to which services provided met the established criteria. These data were converted to numerical scores, yielding measures which permitted a comparison of the quality of care provided in the swing-bed hospitals and comparison nursing homes.

Outcome indicators of quality are concerned with the end results of

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[2]A detailed review of the quality measurement literature is contained in Landes et al. (1979).

patient care, such as mortality rates or changes in disease or functional status, and assess the ultimate impact of the care process. A major problem in using outcome measures alone as a basis for quality assessment is the difficulty in attributing the observed outcome to services provided, since patient related factors such as knowledge of the illness, patient satisfaction, and compliance, may affect the outcome of care. In addition, there are difficulties in determining appropriate outcomes for long-term care patients such as the chronically ill, where the relatively static nature of the conditions involved makes the concept of "improvement" difficult to define and measure.

Outcome measures are not used in this evaluation for two reasons. First, effective and meaningful collection of outcome-related data was not possible within the scope of the quality analysis. Second, the study was primarily designed to identify factors at the hospital level which might indicate an inability to provide adequate care for long-term care patients. Hence, the emphasis was placed on the process of patient care in order to identify those areas in which hospitals might be deficient.

C. METHODS

This section describes the data sources, variables, and analytic methods used in the quality component of the evaluation.

1. Data Sources

Data sources used in the quality analysis are enumerated in Table V.2. The following discussion provides an overview of each of the sources listed.

a. Long-Term Care Survey: The Long-Term Care Survey, the major data source for the quality analysis, was administered to nursing personnel by an interviewer at 30 swing-bed hospitals and at a group of 15 Medicare- (and/or Medicaid-) certified comparison nursing homes in early 1978. Six of the hospitals were located in Texas, fifteen in Iowa (three in western Iowa and twelve in central Iowa), and nine in South Dakota. Swing-bed hospitals chosen for the Long-Term Care Survey were those with high swing-bed utilization at the time the survey was administered. Of the comparison nursing homes, five were located in Texas, six in Iowa, and four in South Dakota. These nursing homes, each certified to provide the highest level of care, participated on a voluntary basis and were selected in part on the basis of their reputation as facilities which provide quality long-term care.

The interviewer was a nurse research associate experienced and qualified in the field of long-term care who also participated in the development of the survey instrument. For each swing-bed hospital, the interviewer completed information on all swing-bed patients in the hospital on the day of the visit. In those instances where hospitals also operated

TABLE V.2:

Data Sources Used in the Quality Analysis.

Data Source	Year	Data Obtained and Sample
Long-Term Care Survey[1]	1978	Data Obtained: Patient characteristics, problems, functional capabilities, and services received. Sample: All swing-bed patients (N=85) in 30 swing-bed hospitals and a sample of long-term care patients (N=79) in comparison nursing homes.
Medicare/Medicaid Skilled Nursing Facility Survey Report (Form SSA-1569)[1]	1977	Data Obtained: Structural characteristics/service capacity information. Sample: Medicare/Medicaid-certified SNFs in rural communities in Texas, Iowa, and South Dakota (N=33).
Provider Survey for Hospital Administrators[1]	1977	Data Obtained: Structural characteristics/service capacity information; facility characteristics; swing-bed project operation. Sample: Swing-bed hospitals (N=82).
Medicare Cost Reports[1]	1978	Data Obtained: Information on hospital bed size, occupancy, and costs; swing-bed project operation. Sample: Swing-bed hospitals where the Long-Term Care Survey was administered (N=30).
Nursing Time Study[1]	1978	Data Obtained: Average nursing time per long-term care patient day. Sample: Swing-bed hospitals where the Long-Term Care Survey was administered (N=30).
County and City Data Book[2]	1974-1975	Data Obtained: Demographic and economic characteristics. Sample: Counties containing swing-bed hospitals where the Long-Term Care Survey was administered (N=30).
American Hospital Association (AHA) Hospital Survey[2]	1977	Data Obtained: Facility characteristics. Sample: Swing-bed hospitals where the Long-Term Care Survey was administered (N=30).

[1]Copies of data collection instruments are in the Data Forms Supplement.

[2]Publication is listed in the References.

any type of long-term care unit, only those long-term care patients in the acute care part of the hospital were considered swing-bed patients (in keeping with the experimental reimbursement procedure). In the comparison nursing homes, data were collected on a random sample of skilled nursing care patients in the facility on the day of the interviewer's visit. A small number of intermediate care patients were randomly selected from the comparison nursing homes in order to allow comparison with intermediate care provided in swing-bed hospitals.[3]

The distribution of surveyed patients by payment source and level of care within each type of facility is presented in Table V.3. The study results are based on a total of 164 patients, 85 hospital patients and 79 nursing home patients. (The six personal care patients encountered in swing-bed hospitals were ultimately excluded from the study analyses, however.) Of the 85 hospital patients, 58% were skilled level patients and 35% intermediate level, and among the nursing home patients, 90% were skilled level and only 10% were at the intermediate level. In swing-bed hospitals, Medicare was the predominant payment source, covering 49% of the swing-bed patients in the quality study. In nursing homes, 35% of the study patients were covered by Medicare and 47% by Medicaid.

Respondents to the Long-Term Care Survey were members of the facility nursing staff. They provided information on each patient based upon both their own personal knowledge and the patient's medical record.[4] Data obtained consisted primarily of demographic, medical, functional, psychosocial, and related information about each individual patient. Information on the frequency of physician visits was also obtained. (The Data Forms Supplement contains a copy of the entire survey instrument.) The survey also covered patient problems and services provided, which formed the basis for the computation of the process measures of quality used in this study.[5]

For each patient, respondents were presented with a list of 27 problems commonly found among long-term care patients and asked to identify one problem as the patient's primary problem and others as secondary problems. The 27 problems are listed in Table V.7. Additional survey questions were used to help identify all relevant patient problems. Data were collected for up to six problems per patient, a res-

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[3]It was originally anticipated that there would be very few intermediate care patients in the swing-bed hospitals.

[4]No information was gathered from patients themselves in the course of the survey.

[5]The reliability of the instrument was assessed as part of the development process and found to be adequate. See Landes et al. (1979, page III.44) for a complete description of this process.

TABLE V.3:

Frequency and Percentage Distribution of Study Patients by Level of Care, Payment Source, and Type of Facility.

Level of Care[1]	Payment Source	All Facilities Combined N	%[2]	Experimental Hospitals N	%[2]	Comparison Nursing Homes N	%[2]
		Frequency and Percentage Distribution of Study Patients					
Skilled	Medicare	70	58.3	42	85.7	28	39.4
	Medicaid	34	28.3	0	--	34	47.9
	Private Pay	15	12.5	6	12.2	9	12.7
	Unknown	1	0.8	1	2.0	0	--
	Total	120	100.0	49	100.0	71	100.0
			(73.2)		(57.6)		(89.9)
Intermediate	Medicaid	7	18.4	4	13.3	3	37.5
	Private Pay	30	78.9	26	86.7	4	50.0
	Unknown	1	2.6	0	--	1	12.5
	Total	38	100.0	30	100.0	8	100.0
			(23.2)		(35.3)		(10.1)
Personal	Private Pay	6	100.0	6	100.0	0	--
	Total	6	100.0	6	100.0	0	--
			(3.7)		(7.1)		(0.0)
Total	Medicare	70	42.7	42	49.4	28	35.4
	Medicaid	41	25.0	4	4.7	37	46.8
	Private Pay	51	31.1	38	44.7	13	16.5
	Unknown	2	1.2	1	1.2	1	1.3
	Total	164	100.0	85	100.0	79	100.0
			(100.0)		(100.0)		(100.0)

[1]Medicare reimburses for skilled care only. Medicaid reimburses for skilled and intermediate care only.

[2]Non-bracketed percentages represent the proportion of study patients associated with a particular payment source within each level of care and type of facility. Bracketed percentages indicate the proportion of patients at each level of care within each type of facility.

Source: Long-Term Care Survey

triction which eliminated data collection on a total of only six problems for all 158 patients combined. The 27 problem categories encompassed 97% of all problems identified in the course of the survey (problems other than the 27 were also recorded during data collection).

For each problem identified, information on the care provided for that problem was collected using an explicit list of services determined to be appropriate for dealing with the problem. As an illustration of the services involved in the criteria sets, Figure V.1 presents the services listed in the criteria set for the treatment of dehydration. (The specific criteria sets for all 27 problems are included in the Data Forms Supplement.) For each patient problem identified by the respondent, the frequency with which each service was provided and the type of individual who most frequently provided the service were recorded. Flexibility was maintained by providing for exceptions when certain services specified in the criteria sets were inappropriate for the treatment of a particular patient.

In the development and refinement of the problem list and the service criteria sets, the evaluation staff worked in conjunction with the Colorado Foundation for Medical Care (CFMC), the Colorado PSRO. A Quality Advisory Panel was formed specifically for review and revision of the problem and criteria sets. The Panel, which worked extensively with the evaluation staff, consisted of four RNs, three physicians, a physical therapist, and a social worker, all with significant expertise in long-term care.

In all, calculation of the numerical quality scores was based upon 597 patient problems identified among the 158 patients. Of the 597 problems, 45.1% were associated with hospital patients, and 54.1% with nursing home patients. Data were collected on a total of 6,859 services which were considered appropriate in the provision of care for the 597 patient problems. Thus, while the sample size may appear relatively small from the point of view of facilities or, to a lesser extent, patients, it is relatively large from the perspective of problems and services.

b. Medicare/Medicaid Skilled Nursing Facility Survey Report: As stated earlier in this chapter, Medicare and Medicaid certification procedures require information on the compliance of skilled nursing facilities with the SNF conditions of participation (see Table V.1). Survey report forms were obtained for 33 certified SNFs in the experimental states, eight of which were also in the comparison nursing home group in which the Long-Term Care Survey was administered. Data on the availability of six specific long-term care services which were not required of the experimental hospitals for the provision of swing-bed care were extracted from these reports. These services are: physical therapy, speech therapy, occupational therapy, dental services, social services, and patient activities. This information was used in the analyses comparing the swing-bed hospitals to SNFs on the availability of the services required by Medicare and Medicaid regulations.

FIGURE V.1:

Illustrative Criteria Set: Service Criteria and Weights for Dehydration.

PROBLEM: Dehydration

Center for Health Services Research
University of Colorado Health Sciences Center

SERVICE CRITERIA	SERVICE WEIGHT	FREQUENCY AND FREQUENCY WEIGHT	PROVIDER AND PROVIDER WEIGHT
1. Medical examination and prescribed treatment	20	50 - Initial & PRN (less than dly-mthly) 50 - Initial only (new admissions) 20 - Initial only	50 - MD
2. Nursing assessment - to include a) skin elasticity, b) weight, c) signs of edema present, d) temperature, e) presence of cracked lips and/or dry tongue, f) color, odor and amount of urine, g) specific gravity, h) mentation, i) presence of vomiting, j) diarrhea, k) abnormal sweating, l) vital signs	20	50 - Initial & daily 40 - Initial and RPN 40 - Initial only (new admissions) 15 - Initial only	50 - RN 40 - LPN
3. Blood pressure, pulse, respiration To be reported to MD if pulse over 100/min. if respiration over 28/min.	10	50 - BID 40 - daily 20 - 3 x weekly 0 - PRN	50 - RN, LPN or Aide
4. Temperature Report temp. of over 101.4 to MD	10	50 - BID 40 - Daily 20 - 3 x weekly 0 - PRN	50 - RN, LPN or Aide
5. Force fluids to 2400 cc intake in 24 hours	15	50 - every shift, daily 50 - PRN	50 - RN - (IV, Subq, NG, Oral) 50 - LPN - (Subq, NG, Oral) 50 - Aide - (Oral only)
6. Intake and output	10	50 - every shift 25 - daily 0 - PRN	50 - RN, LPN or Aide
7. Weight	10	50 - daily 40 - 3 x weekly every other day 20 - weekly 0 - PRN	50 - RN, LPN or Aide
8. Oral hygiene	10	50 - every 4 hours 35 - every shift 20 - daily 0 - PRN	50 - RN, LPN or Aide
9. Skin Care	5	50 - every 4 hours 35 - every shift 20 - BID 0 - PRN	50 - RN, LPN or Aide
10. Urine specific gravity	10	50 - daily 25 - 2 x weekly 0 - PRN	50 - RN, LPN or Aide
11. Urinalysis	5	50 - as ordered by MD/PRN	50 - Lab Tech
12. CBC	5	50 - as ordered by MD/PRN	50 - Lab Tech
13. SMA-12	5	50 - as ordered by MD/PRN	50 - Lab Tech
14. BUN	5	50 - as ordered by MD/PRN	50 - Lab Tech

c. Provider Survey for Hospital Administrators: This survey was administered to 82 swing-bed hospital administrators and included information on whether swing-bed hospitals provided any of the six long-term care services for which corresponding data were gathered on nursing homes (see above). It also included information on hospital and swing-bed project characteristics used in the analyses of the correlates of hospital quality. A complete description of the Provider Survey is presented in Chapter III, Section C.1.

d. Additional Data Sources: The Medicare Cost Reports, Nursing Time Study, County and City Data Book, and American Hospital Association (AHA) Hospital Survey all supplied information for the 30 swing-bed hospitals where the Long-Term Care Survey was administered. These sources provided information on community, facility, and swing-bed project characteristics that was used in analyzing the correlates of quality. The Medicare Cost Reports are discussed further in Chapter VI, Section D.1; the Nursing Time Study in Appendix C; and the County and City Data Book and AHA data sources in Chapter IV, Section C.1.

2. Variables and Variable Construction

The variables used in the quality analyses are summarized in Table V.4 in four major categories: case mix variables; process measures of quality; structural measures of quality; and correlates of quality. Each is described below.

a. Case Mix Variables: For purposes of this analysis, case mix variables consist of patient descriptors which cover the following patient characteristics: admitting diagnoses (primary and secondary); long-term care patient problems (primary and secondary); functional ability; level of care; payment source; and other patient data such as demographic characteristics (age, sex), sensory impairments (vision, hearing, and speech), psychological/social status, medical condition, and type of care. These variables were selected for their relevance to a quality assurance program and were used as independent variables in assessing factors which affect the quality of care provided to patients. (The Long-Term Care Survey in the Data Forms Supplement contains the categories used for data collection of each variable.)

Admitting diagnoses were recorded and analyzed on the basis of 16 diagnostic categories developed by the Office of Nursing Home Affairs (DHEW) for the analysis of long-term care patients. These diagnoses were further categorized into eight general groupings. The list of 27 patient problems used in the analysis was developed in order to measure specifically long-term care patient problems. The problems were categorized into four general groupings for analytic purposes: sensory impairments, nursing-oriented problems, medically-oriented problems, and psychosocial problems. It should be emphasized that long-term care problems, which include psychosocial as well as medical problems, are generally regarded as better case mix indicators in the long-term care field than medical diagnoses.

Functional ability was based on the patients' degree of independence in eight activities of daily living (ADLs): bathing, dressing, toileting, transfer, urinary and bowel continence, feeding, and mobility. In addition to examining each ADL category separately, an ADL Index was defined using the procedure outlined in Katz and Akpom (1976) and is equal to the number of activities (out of six) in which the patient is judged independent. The six activities used in the Index are: bathing, dressing, toileting, transfer, continence (urine and bowel combined), and feeding. The result is a composite index covering a continuum from independence in all six ADL functions to total depen-

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TABLE V.4:

Variables/Measures Used in the Quality Analyses.

Case Mix

(a) Admitting (medical) diagnoses
(b) Long-term care patient problems
(c) Functional capabilities (Activities of Daily Living (ADLs))
(d) ADL Index
(e) Additional patient characteristics (demographic characteristics, sensory impairments, psychological/social status, medical condition, and type of care)
(f) Level of care
(g) Payment source

Process Measures of Quality

(a) Facility quality scores
(b) Patient quality scores
(c) Problem quality scores
(d) Service quality scores
(e) Frequency of physician visits
(f) Written discharge plans

Structural Measures of Quality

(a) Physical therapy
(b) Speech therapy
(c) Occupational therapy
(d) Dental services
(e) Social services
(f) Patient activities
(g) Structural Quality Index

Correlates of Quality

(a) Community characteristics
(b) Facility structural and staffing characteristics
(c) Patient case mix characteristics
(d) Swing-bed project characteristics

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dence in all functions. The Index was tested for its reliability as a Guttman scale. The coefficient of reproduceability of .947 indicates that a valid scale exists and the coefficient of scalability, .785, indicates that the scale is in fact unidimensional and cumulative. The ADL Index is a more useful case mix measure than the individual ADL scores since it reflects a patient's aggregate functional ability and also facilitates the classification of patients into meaningful groups according to overall functional ability.

Level of care was classified as skilled or intermediate. Personal care patients were excluded from the analysis because the Long-Term Care Survey was not designed to measure quality of care for that level. Payer was defined as the source of payment for the patient on the day the Long-Term Care Survey was administered. In cases where there were multiple sources of payment, a hierarchy was established for determining the payer. Medicare was considered first, then Medicaid, and finally private payers.

Additional patient characteristics analyzed included measures of psychological/social status, represented by patient behavior (measured in terms of appropriate vs. inappropriate the majority of time) and the presence of family support (absence of problems associated with no family, abandonment, or distance separation). Also, medical condition was considered in terms of change in a patient's physical and psychological status from admission to the time of the survey. In order to measure the potential intensity of resource consumption according to major categories of long-term care needs, the number of problems in each of four major problem groupings mentioned above (sensory impairments, nursing-oriented problems, medically-oriented problems, and psychosocial problems) were also used as case mix measures. These are referred to as "intensity" variables in this chapter. Finally, an indicator of whether a patient was receiving rehabilitative care was also used as a case mix variable measuring the rehabilitative potential of the patient. This variable should be interpreted cautiously, however, since it is dependent on care received as well as patient characteristics.

b. Process Measures of Quality: The first four process quality measures (service, problem, patient, and facility scores) are the primary measures of quality used in the analyses. Service scores, which form the basis of the problem, patient, and facility scores discussed below, were used to measure the adequacy of provision of each service required for each patient problem. Service scores can range from 0 to 100 depending on whether the manner in which the service was provided was totally inadequate, entirely adequate, or in between. As an example, Figure V.1 presents the services judged appropriate for the treatment of dehydration (except under certain circumstances, in which case the interviewer recorded exceptions) by the Quality Advisory Panel. The "frequency" and "provider" columns contain the numerical scores assigned to the different levels of frequency and provider, ranging from the minimum shown up to a 50 point maximum for each. These were also reviewed by the Quality Advisory Panel.

Service scores are defined as the sum of the frequency and provider scores. For example, if a nursing assessment was only done initially by an LPN, a frequency value of 15 and a provider value of 40 would result in a total service score of 55 out of a possible 100. Where appropriate exceptions were recorded, the maximum number of points was given on the premise that not providing a service for a medically correct reason constituted quality care. In cases where the minimum level of frequency or provider was not met, no points were given for either, resulting in a service score of zero. This approach was premised on the assumption that if either frequency or provider fell below the established minimum, the service was provided ineffectively and no points should be given.

Each of the patient problems encountered in the survey was given a problem quality score representing a weighted average of all the service scores for the problem. Using the dehydration criteria set in Figure V.1 as an example, the problem score is the sum of the 14 service scores--each multiplied by the appropriate value in the "service weight" column--divided by the sum of the weights, and multiplied by 100. Problem scores fall between 0 and 100 since they are weighted averages of the service scores, which range from 0 to 100. The resulting score represents a percentage of the maximum possible number of points which could be achieved.

Individual patient quality scores were obtained by averaging the problem scores for each patient. Thus, if a particular patient had five problems, then the patient score was computed by averaging the five problem quality scores. Since the patient score is an arithmetic mean of the problem scores, it also ranges between 0 and 100.

Two facility quality scores were calculated for each facility. The first was computed by averaging all patient scores in the facility (hospital or nursing home). The second was computed by averaging all problem scores for the facility. The two facility scores were analyzed concurrently since a facility score based solely on problems could be biased toward the quality of care provided to patients who reported an above average number of problems. Both facility scores range between 0 and 100.

Two additional indicators of process quality were included in the analysis. One, frequency of physician visits, was categorized into eight levels, ranging from never visited by a physician to daily visits. The second indicator, presence of a written discharge plan for the patient, was included due to the importance of discharge planning in long-term care. Only the presence or absence of a discharge plan was recorded, however, not its adequacy or comprehensiveness.

c. Structural Measures of Quality: Structural quality measures were used to indicate presence or absence of the six previously discussed services included in the Medicare/Medicaid SNF conditions of participation waived for the experiment--physical therapy, speech ther-

apy, occupational therapy, dental services, social services, and patient activities. Also, a Structural Quality Index was defined as the total number of these six services provided by the facility and ranged in value from zero to six.

d. Correlates of Quality: Four types of variables were identified which might be related to quality in the swing-bed hospitals: community characteristics, facility structural and staffing characteristics, patient case mix, and swing-bed project characteristics. All variables considered as potential correlates of quality are listed in Table V.5. Owing to the focus on quality of care provided by swing-bed hospitals, only case mix variables were assessed as potential correlates of quality for the comparison nursing homes. The community variables are county-wide totals for project hospital counties. They were included in order to assess the extent to which community characteristics are related to a hospital's ability to provide quality care.

The hospital structure and staffing variables include measures of facility size, acute care utilization, expenses per day, orientation toward care for the elderly, and staffing ratios. They were analyzed in order to determine the relationship between hospital organization and the quality of care. The majority of the structural variables are based on acute care hospital characteristics, excluding the operation of long-term care units. This was done because the intent of the analysis was to relate only acute care characteristics of the hospital to the quality of swing-bed care provided.

The case mix variables considered in this analysis were described previously. Selection of the case mix factors to be used in these analyses was based on correlations with patient quality scores and substantive considerations concerned with resource consumption.

The swing-bed project characteristics represent factors which may be influenced through regulation or training and therefore have potential quality assurance implications. The nurse and physician staffing variables measure both resources used in the operation of the program and attitude toward the project. The nursing time variable was constructed using the time study data described in Appendix C and represents the actual time spent per swing-bed patient day. The other nursing and physician variables were obtained from the various surveys discussed earlier. Utilization characteristics were measured in terms of swing-bed days and swing-bed days as a percentage of acute care and swing-bed care days. Long-term care services were used to measure the effect of structural quality measures on the process measures of care.

A final group of variables was selected to reflect various aspects of swing-bed project operation. Orientation and technical assistance were selected from operational issues and problems identified by hospital administrators in the Provider Survey. These two factors were selected because they were mentioned by more than 10% of the respondents and were likely to be directly related to the delivery of quality long-term patient care.

TABLE V.5:

Variables/Measures Used in the Analysis of the Correlates of Swing-Bed Hospital Quality.

Community Characteristics (County)

(a) Population per square mile (1975)
(b) Per capita income (1974)
(c) Physicians per 10,000 population (1975)
(d) Population over 65 year of age (1975)

Hospital Structural and Staffing Characteristics

(a) Number of acute care beds
(b) Acute care occupancy rate
(c) Acute care average length of stay
(d) Hospital inpatient expenses per inpatient day
(e) Medicare percentage of acute care patient days
(f) Presence of hospital long-term care unit
(g) RNs per inpatient day
(h) Number of admitting physicians per acute care bed

Patient Case Mix Characteristics

(Listed in Table V.4)

Swing-Bed Project Characteristics

Nursing staff:
(a) Average nursing time per swing-bed patient day
(b) Reluctance of nurses to provide long-term care
(c) Nurse training in rehabilitative nursing
(d) Nurse in-service long-term care training

Physicians:
(a) Average number of visits per swing-bed patient
(b) Reluctance of physicians to admit long-term care patients

Utilization:
(a) Swing-bed patient days
(b) Swing-bed days as a percentage of acute care and swing-bed patient days (in acute care section)

Long-Term Care Services (Structural measures of quality):
(a) Physical therapy
(b) Speech therapy
(c) Occupational therapy
(d) Dental Services
(e) Social Services
(f) Patient activities
(g) Structural Quality Index

Project operation:
(a) Staff attendance at orientation
(b) Inadequate technical assistance

3. Analytic Methods

Methods used in the quality component are discussed in this section according to the three main areas of the quality evaluation: the case mix analyses, which deal with differences in patient characteristics between swing-bed hospitals and comparison nursing homes; comparative quality analyses, which examine the quality of care provided in the two types of facilities; and analyses of the correlates of quality which are designed to identify the factors related to the quality of care.

In choosing statistical methods, underlying assumptions were tested in several cases to determine the most appropriate statistical method. In several instances, two statistical procedures were used in the same situation since (1) one was not clearly superior to the other, (2) each shed a different light on the particular problem, or (3) approximate concurrence using two procedures would increase the credibility of results (conversely, substantial disagreement between the results of two procedures would signal the need for caution in interpretation of certain findings).

a. Case Mix Analyses: Comparisons were made between swing-bed hospital and comparison nursing home patients on each of the case mix characteristics listed in Table V.4. All admitting diagnoses (secondary and primary) were used in comparing diagnostic profiles between hospitals and nursing homes. A chi-square test was used for overall profile comparisons and Fisher's Exact Test was used to compare the proportion of individuals within each diagnostic category for nursing homes and hospitals. Profiles using only primary diagnoses were also analyzed. In addition, patient profiles were analyzed for only skilled level patients in order to control for the influence of level of care on case mix. This was done because of the disproportionate number of skilled level patients (58% in the hospitals, and 90% in the nursing homes) in the two samples.

Other case mix profiles based on long-term care problems and activities of daily living were analyzed in much the same manner as the profiles of admitting diagnoses. First, swing-bed hospital and nursing home case mix profiles were compared, and second, the extent to which case mix differences were due to level of care was investigated. Additional patient characteristics (demographic characteristics, sensory impairments, etc.) were not analyzed as profiles but as individual proportions using Fisher's Exact Test for proportions and the two sample t-test for mean differences for continuous variables.

b. Quality of Care Analyses: The first four analyses involved determinations of differences between comparison nursing homes and swing-bed hospitals in terms of process quality scores at the facility, patient, problem (both overall and for each of the 27 problems separately), and service levels. Quality of care was analyzed for each level since different factors can influence the variation in

quality scores at the various levels. Analysis at each level included an investigation of differences between hospitals and nursing homes with respect to mean values and frequency distributions of quality scores. T-tests and Wilcoxon tests were used to test for mean (or shift) differences and chi-square tests were used to test for differences in the frequency distributions.[6] The sign test was used to test for an overall difference in the two facility types in problem level quality scores for the 27 individual problem types.[7]

Prior to finalizing the analytic methods used in the quality of care analyses, the empirical distributions of the problem, patient, and facility level quality scores were analyzed. Since they were to be used as dependent variables in regression analysis and analyzed using both t-tests and F-tests, the null hypothesis of an underlying normal distribution was tested using the Kolmogorov-Smirnov goodness of fit test.[8] Nursing home and experimental hospital quality scores at each level were tested separately and together. It was not possible to reject the null hypothesis of an underlying normal distribution in any instance. In general, the distributions of quality scores at the problem, patient, and facility levels are symmetric, unimodal, and sufficiently near normality so as to warrant the application of the several techniques which require an underlying normal distribution.

Since the service level quality scores are clearly not normally distributed (see Table V.14), no test for normality was performed at the service level. The service level analysis involved the classification of the 151 unique services into 14 general categories which lend themselves to regulatory considerations from the perspective of quality assurance.[9] These service categories are: (1) social and recreational; (2) therapeutic and mental health; (3) physical and occupational therapies; (4) speech therapy; (5) inhalation therapy; (6) sensory compensation; (7) laboratory; (8) EKG; (9) radiology; (10) professional nursing (tasks performed by RNs and LPNs only); (11) non-professional nursing; (12) physician; (13) dietary; and (14) pharmacy. Swing-bed hospital and comparison nursing home differences in average service quality scores were tested using the chi-square test for distributional

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[6]The Wilcoxon test is less sensitive to extreme values than the t-test. Its significance levels can often be used to confirm t-test results and, in addition, are generally regarded as more accurate in the presence of outliers. See Conover (1971) for a discussion of the Wilcoxon test.

[7]See Conover (1971) for an explanation of this test.

[8]Conover (1971).

[9]Appendix D identifies the individual patient services which make up each service category.

differences since the service scores are discrete.

Quality scores at the patient, problem, and service levels were also analyzed to determine whether quality differences exist by levels of care. The quality scores for skilled level patients in the hospitals and comparison nursing homes were compared in order to account for the disproportionate number of skilled level patients in the two samples. For the hospitals alone, skilled and intermediate level patients were also compared using patient, problem, and service quality scores.

An additional analysis was performed at the patient level in order to investigate differences in quality between hospitals and nursing homes, taking case mix into consideration. The selection and use of analytic techniques for this comparison was determined by the underlying differences between the facility types. First, as will be shown in Section D.1, swing-bed hospital patients are significantly different from nursing home patients on several case mix measures. Second, the relationships between case mix characteristics and patient quality scores are different within the two facility types. Hence, a regression analysis, using quality as a dependent variable and a dummy variable for facility type, along with other correlates of quality (for both types of institutions), as independent variables, was inappropriate. The following data analytic approach was therefore taken, using discriminant analysis, with facility type as the classification variable, in order to investigate the relationship between quality of care and facility type, taking case mix differences into consideration.

The analysis included the calculation of three discriminant functions. The first function used the patient quality score alone as the single independent variable, the second used case mix measures alone, and the third used the patient quality score and case mix measures together. The square of the canonical correlation coefficient for each discriminant function (analogous to the R^2 in regression) measures the percentage of variation in facility type which is explained by each group of measures. The explanatory power of the patient quality score alone (for the first discriminant function) was compared to the incremental explanatory power of quality when added to the case mix variables. This incremental explanatory power was measured by the difference between the squared canonical correlations for the second and third discriminant functions.

Another aspect of the quality assessment entailed a determination of whether swing-bed hospitals and comparison nursing homes differed in terms of the frequency of physician visits and the presence of discharge plans for study patients. Differences in the frequency of physician visits across the two facility types were investigated using a chi-square test. The differences in the percentage of patients with written discharge plans were assessed with Fisher's Exact Test. The extent to which the presence of hospital and nursing home differences for these two variables was due to payer or level of care was investigated using the same procedures, with payer and level of care as stratifying variables.

The final stage of the quality analysis involved an assessment of nursing home and hospital differences in service capacity, as measured by the structural quality measures listed in Table V.4. Differences in the proportion of facilities (nursing homes vs. hospitals) offering each of the six services were examined using Fisher's Exact Test, while differences in the mean number of the six services available by facility type were examined with the t-test. The six services used include: physical therapy, speech therapy, occupational therapy, dental services, social services, and patient activities. The analysis included all participating swing-bed hospitals and was not restricted to those in which the Long-Term Care Survey was administered, as were the quality of care analyses described previously. The nursing home sample was the group of 33 Medicare/Medicaid-certified skilled nursing facilities discussed in Section C.1.

c. Correlates of Quality Analyses: Two distinct analyses of the correlates of quality were conducted as part of this evaluation. The first entailed a comparison of the case mix correlates of quality in hospitals and nursing homes. It was designed to identify differences in case mix factors related to quality in the two groups of facilities. The second was a more thorough investigation of the correlates of quality in the swing-bed hospitals alone, using the community, facility, case mix, and swing-bed project characteristics listed in Table V.5.

The comparison of quality correlates used regression techniques to identify case mix factors related to patient-level quality in the swing-bed hospitals and nursing homes, as well as to compare the differential influence of each factor in each group of facilities. Case mix variables were the only independent variables in this analysis because they were regarded as highly important on conceptual grounds and, in fact, were the only factors which could be measured on a comparable basis for both facility types. Differences in the relationships between case mix and quality in each of the samples (as discussed previously) made it necessary to analyze the hospital and nursing home patients separately.

The regression analysis included two steps. In the first step, two separate regression equations were estimated, one for the sample of hospital patients and the other for the sample of nursing home patients. The dependent variable in both cases was the patient quality score and the independent variables were case mix measures which were either (1) significantly correlated with patient quality scores within the particular group of facilities or (2) selected on substantive grounds. The independent variables were not necessarily the same in these two equations. Second, all variables which had significant regression coefficients ($p<.10$) in either equation were combined and used as independent variables in a single new equation, which was applied to both groups of patients separately. In this manner, the differing impacts of each independent variable on quality in each group of facilities could be compared. Differences in the regression coefficients for the independent variables in the two

equations were assessed using t-tests. The result was an indication of the extent to which the relationship between quality and each independent variable differed by type of facility.

The analysis of the correlates of hospital quality used regression techniques to identify the factors related to quality in the swing-bed hospitals. All analyses were performed at the patient level using the total sample of hospital patients. The purpose was to assess the correlates of quality in swing-bed hospitals, using a more extensive set of variables than was available for the assessment of differences in quality correlates between hospitals and nursing homes.

This analysis was also data analytic in nature and involved three steps. The first was to evaluate the influence on quality of factors beyond the control of the swing-bed project. The variables considered in the first step were taken from the community, facility, and case mix variables identified in the first three variable categories in Table V.5. Regression analysis was used to identify those factors which explained a significant amount of the variation in quality. Thus, the R^2 of the regression equation represents the percentage of variation in quality which can be explained by these factors. The second step involved adding independent variables to the regression equation developed in the first step. This set of variables included characteristics of the swing-bed project in the fourth variable category in Table V.5. Several regression equations were developed at this step to measure the influence of different types of factors individually. The difference in R^2 between the first regression equation and those developed at this step approximates the percentage of variation in quality attributable to the swing-bed project characteristics, after accounting for the variation attributable to non-project factors. Finally, in step three, a combined explanatory equation was developed which identified the most significant factors related to quality out of all those considered in the first and second analytic steps.

D. FINDINGS

The findings of the quality component of the evaluation are presented in three parts: case mix comparisons between swing-bed hospital and comparison nursing home patients; quality of care comparisons between the two types of facilities; and findings on the factors affecting the quality of care. Statistical significance is considered to exist at the .10 level or less, although exact significance levels are given for the reader who may wish to use another level for interpretation.

1. Case Mix Characteristics

The intent of this analysis is (1) to investigate case mix differences between swing-bed hospital and comparison nursing home patients which can be used in interpretation of other results of the quality analysis; and (2) to develop a profile of swing-bed patients as an aid in struc-

turing recommendations for a quality assurance program. The analyses involve comparisons of hospital and nursing home patients on the following measures of case mix: admitting diagnoses, long-term care problems, activities of daily living, and additional patient characteristics (demographic characteristics, sensory impairments, psychological/social status, medical condition, and level and type of care). Also, the degree to which case mix differences are due to differences in level of care is investigated.

a. Admitting Diagnoses: Primary and secondary diagnoses were recorded for each patient at the time of admission as a swing-bed patient, using 16 diagnostic categories developed for analysis of long-term care patients. These 16 diagnoses are further categorized into eight general groupings.

Table V.6 presents the number and percentage of study patients in the general groupings and in each diagnostic category by type of facility. Since patients could have more than one diagnosis, the number of diagnoses recorded is greater than the number of patients. The diagnostic groupings with the highest frequency of occurrence in both the hospitals and nursing homes are neurological diseases, cardiovascular diseases, and musculoskeletal disorders. For hospitals and nursing homes combined, the individual diagnostic categories with the highest frequency of occurrence (in order of frequency) are: heart disease (present in 27.2% of all patients), stroke and "other" (each present in 26.6% of the patients), fractures (23.4%), and diseases of the musculoskeletal system (22.8%). The same pattern of high frequency diagnoses is present among swing-bed hospital patients alone. The high frequency pattern for the nursing home sample differs in that stroke and "other" are most frequent, followed by heart disease, chronic brain disease, and fractures.

The overall diagnostic profile differences between the experimental hospitals and the comparison nursing homes are not significant at the .10 level using the chi-square test. Among the individual diagnoses, there are significant differences in only three instances (all neurologically related): chronic brain disease (p=.022); neurological disease (p=.001); and neuroses and psychoses (p=.007). These, however, should not be regarded as substantial differences in view of the insignificant overall profile distribution.

Patient diagnostic profiles were also evaluated using only primary diagnosis. For both facility groups combined, the most frequent primary diagnoses are fractures (19.0%), stroke (18.4%), and neoplasms (10.8%). Among swing-bed patients the same three primary diagnoses are most frequent, while among comparison nursing home patients, stroke, fractures, and neurological disease are the most frequent. Heart disease, the most frequent diagnosis when all diagnoses are included, is relatively infrequent as a primary diagnosis. There are no overall profile differences between the groups of facilities when primary diagnoses are considered separately (p=.99).

TABLE V.6:

Frequency and Percentage Distribution of Patients with Each Primary and Secondary Admitting Diagnosis by Type of Facility.

Admitting Diagnoses	All Facilities Combined N	All Facilities Combined %	Experimental Hospitals N	Experimental Hospitals %	Comparison Nursing Homes N	Comparison Nursing Homes %	Signif. Level[2]
	Frequency and Percentage[1] of Patients with Each Admitting Diagnosis						
Cardiovascular Disease:	65	41.1	31	39.2	34	43.0	.746
Heart disease	43	27.2	21	26.6	22	27.8	.500
Generalized arteriosclerisis and hypertension	31	19.6	15	19.0	16	20.3	.500
Musculoskeletal System Disorders:	65	41.1	28	35.4	37	46.8	.196
Diseases of musculoskeletal system	36	22.8	16	20.3	20	25.3	.285
Fractures	37	23.4	16	20.3	21	26.6	.226
Endocrine Diseases:							
Diabetes	22	13.9	10	12.7	12	15.2	.409
Diseases of Respiratory System	16	10.1	8	10.1	8	10.1	.604
Diseases of Digestive System	15	9.5	10	12.7	5	6.3	.139
Neurological and Related Diseases:	101	63.9	40	50.6	61	77.2	<.001
Chronic brain disease	31	19.6	10	12.7	21	26.6	.022
Stroke	42	26.6	19	24.1	23	29.1	.295
Neurological disease	17	10.8	2	2.5	15	19.0	.001
Neuroses and psychoses	7	4.4	0	--	7	8.9	.007
Mental retardation	0	—	0	--	0	—	
Neoplasms	23	14.6	10	12.7	13	16.5	.326
Eye and ear diseases	7	4.4	2	2.5	5	6.3	.221
Diseases of the Genitourinary System	13	8.2	4	5.1	9	11.4	.123
Other	42	26.6	19	24.1	23	29.1	.295

X^2=14.59 df=12 (p=.26)[3]

[1]Percentages for each category are based on 79 hospital patients and 79 nursing home patients, or 158 total patients. Column percentages sum to greater than 100% since each percentage represents a percentage of patients, not diagnoses.

[2]Values are the exact p-values, or significance levels, associated with Fisher's Exact Test for the difference between two proportions.

[3]Calculation of the chi-square statistic was based on 162 separate diagnoses in swing-bed hospitals and 220 in comparison nursing homes. Neuroses and psychoses and eye and ear diseases were combined with "other" due to an expected cell sizes less than five.

Source: Long-Term Care Survey

Patient profiles for all diagnostic groupings of primary and secondary diagnoses were also evaluated for skilled level patients only. The overall differences between hospital and nursing home patients are again insignificant using the chi-square test, indicating that the basic results do not change when adjustments are made for differences in the sample proportions in the level of care.

b. Patient Problems: Primary and secondary long-term care patient problems were recorded for each patient at the time of the survey. The 27 problems are organized into four basic categories for analytic purposes: sensory impairments, nursing-oriented problems, medically-oriented problems, and psychosocial problems.

Table V.7 presents the frequency and percentage of patients with each individual problem and in each category of problems for both swing-bed hospitals and comparison nursing homes. For both facility types, nursing-oriented problems are by far the most numerous, followed by psychosocial problems. The most frequently identified individual problems (in order of frequency) for both types of facilities are orthopedic immobility (42.3%), incontinence of urine (39.7%), neurological immobility (33.3%), and incontinence of bowels (28.8%). In swing-bed hospitals, the problems identified most frequently are orthopedic immobility, incontinence of urine, pain, and secondary skin condition, while in the comparison nursing homes incontinence of urine, neurological immobility, orthopedic immobility, and incontinence of bowels are mentioned with the greatest frequency.

The overall problem profiles differ significantly between swing-bed hospitals and nursing homes, although the distribution of problems by the four categories are not significantly different using the chi-square test. The frequencies for nine individual problems are significantly different between hospitals and nursing homes. Nursing home patients have a significantly higher frequency of neurological speech disorder, incontinence of urine, incontinence of bowels, neurological immobility, disruptive and disturbing behavior, and difficult family situations. Hospital patients have a significantly higher frequency of secondary skin conditions, pain, and discharge planning problems.

The distribution of primary patient problems for the two facility types was also investigated (although not presented in tabular form). The most frequently occuring primary problems are orthopedic immobility (24.8%) and neurological immobility (20.0%). Among swing-bed hospital patients, the most frequent primary problems are (in order of frequency): orthopedic immobility (31.4%), secondary skin condition (14.3%), and pain (14.3%), while neurological immobility (30.7%), orthopedic immobility (18.7%), and confusion (10.7%), are most frequently identified among nursing home patients.

TABLE V.7:

Frequency and Percentage Distribution of Patients with Each Patient Problem by Type of Facility.

Patient Problems	All Facilities Combined N	All Facilities Combined %	Experimental Hospitals N	Experimental Hospitals %	Comparison Nursing Homes N	Comparison Nursing Homes %	Signif. Level[2]
	Frequency and Percentage[1] of Patients with Each Patient Problem						
Sensory Impairments:	48	30.4	17	21.5	31	39.2	.015
Impaired vision	11	7.1	4	5.1	7	9.0	.267
Impaired hearing	8	5.1	3	3.8	5	6.4	.360
Mechanical speech disorder	0	--	0	--	0	--	--
Neurological speech disorder	33	21.2	11	14.1	22	28.2	.024
Nursing-Oriented Problems:	146	92.4	71	89.9	75	94.9	.230
Primary skin condition	25	16.0	12	15.4	13	16.7	.500
Secondary skin condition	34	21.8	25	32.1	9	11.5	.002
Incontinence of urine	62	39.7	26	33.3	36	46.2	.070
Incontinence of bowels	45	28.8	15	19.2	30	38.5	.006
Constipation	36	23.1	18	23.1	18	23.1	.575
Orthopedic immobility	66	42.3	35	44.9	31	39.7	.314
Neurological immobility	52	33.3	18	23.1	34	43.6	.005
Pain	42	26.9	26	33.3	16	20.5	.052
Dehydration	2	1.3	0	--	2	2.6	.248
Medically-Oriented Problems:	52	32.9	26	32.9	26	32.9	1.000
Urinary tract infection	13	8.3	5	6.4	8	10.3	.282
Malnutrition	9	5.8	5	6.4	4	5.1	.500
Shortness of breath	9	5.8	6	7.7	3	3.8	.247
Dependent edema	15	9.6	10	12.8	5	6.4	.139
Hypertension	8	5.1	3	3.8	5	6.4	.360
Psychosocial Problems:	83	52.5	38	48.1	45	57.0	.265
Confusion	35	22.4	15	19.2	20	25.6	.221
Depression	13	8.3	6	7.7	7	9.0	.500
Anxiety	4	2.6	1	1.3	3	3.8	.310
Apathy	2	1.3	1	1.3	1	1.3	.752
Disruptive or disturbing behavior	15	9.6	3	3.8	12	15.4	.013
Difficult family situation	9	5.8	1	1.3	8	10.3	.017
Loneliness, isolation, lack of socialization	37	23.7	16	20.5	21	26.9	.226
Terminal illness	8	5.1	6	7.7	2	2.6	.138
Discharge planning	4	2.6	4	5.1	0	--	.060

χ^2=32.08 df=16 (p=.01)[3]

[1]Percentages for each problem are based on 79 hospital patients and 79 nursing home patients, or 158 total patients. Column percentages sum to greater than 100% since each percentage represents a percentage of patients, not problems.

[2]Values are the exact p-values, or significance levels, associated with Fisher's Exact Test for the difference between two proportions.

[3]Calculation of the chi-square statistic was based on 275 separate problems in swing-bed hospitals and 322 in comparison nursing homes. Impaired hearing, malnutrition, dehydration, shortness of breath, hypertension, anxiety, apathy, difficult family situation, terminal illness, and discharge planning were combined into one category due to expected cell sizes less than five.

Source: Long-Term Care Survey

The overall profiles of primary problems are significantly different in the two facility groups ($p<.01$, using the chi-square test). In five instances the differences between hospitals and nursing homes are significant at the .10 level or less: primary skin condition ($p=.070$) and neurological immobility ($p=.001$) are more common among nursing home patients, while secondary skin condition ($p=.029$), orthopedic immobility ($p=.056$), and pain ($p=.061$) are more frequent among hospital patients.

The patient profiles for all problems combined were also analyzed for skilled level patients as a separate group in order to test for the effect of differences in the proportion of skilled patients in the two types of facilities. The overall problem differences remain statistically significant using the chi-square statistic ($p=.002$).[10] There are significant differences between the proportions of skilled level patients in the two groups of facilities for 10 problems. Secondary skin condition, shortness of breath, dependent edema, pain, terminal illness, and discharge planning are significantly more frequent among skilled level hospital patients; while neurological speech disorder, incontinence of bowels, neurological immobility, and confusion are significantly more frequent among skilled level nursing home patients.

c. Activities of Daily Living: Swing-bed hospital and comparison nursing home patients were compared on the ability to perform activities of daily living (ADLs). Eight ADLs were evaluated individually: bathing, dressing, toileting, transfer, mobility, continence of urine, continence of bowels, and feeding. Patients were rated as either dependent or independent (with dependence generally implying the need for human assistance) in each of the eight activities. Patients were also categorized on the Index of Activities of Daily Living, a measure of overall functional independence. Table V.8 presents the percentage of patients independent for each activity and at each level of the ADL Index.

The ranking of the eight individual activities from the most functionally difficult activity (bathing, with only 12.0% of patients independent) to the least difficult activity (feeding, with 72.2% independent) is the same for both swing-bed hospital and comparison nursing home patients. In each case, however, the percentage of independent patients is greater in the hospitals than in the comparison nursing homes, and for the four least difficult activities, it is significantly greater. The overall difference in the ADL profiles for the two types of facilities is significant, indicating that swing-bed hospital patients are

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[10]Calculation of the chi-square statistic was based on 197 problems in the swing-bed hospitals and 300 in the comparison nursing homes. The problems of impaired vision, dependent edema, urinary tract infection, and depression were combined with the problems mentioned in footnote 3 in Table V.7 due to expected cell sizes less than 5.

TABLE V.8:

Frequency and Percentage Distribution of Patients Independent in Activities of Daily Living by Type of Facility.

Individual Activities of Daily Living	All Facilities Combined N	%	Experimental Hospitals N	%	Comparison Nursing Homes N	%	Signif. Level[2]
	Frequency and Percentage[1] of Patients Independent in Activities of Daily Living						
Independent in bathing	19	12.0	10	12.7	9	11.4	.500
Independent in dressing	27	17.1	15	19.0	12	15.2	.337
Independent in toileting	30	19.0	17	21.5	13	16.5	.272
Independent in transfer	34	21.5	20	25.3	14	17.7	.167
Independent in mobility	39	24.7	23	29.1	16	20.3	.025
Independent in urine continence	82	51.9	47	59.5	35	44.3	.040
Independent in bowel continence	99	62.7	56	70.9	43	54.4	.024
Independent in feeding	114	72.2	63	79.7	51	64.6	.025
			Sign Test (p=.004)[3]				
Index of Activities of Daily Living[4]							
Independent in all 6 ADL functions	10	6.3	6	7.6	4	5.1	.373
Independent in 5 functions	11	7.0	6	7.6	5	6.3	.500
Independent in 4 functions	12	7.6	6	7.6	6	7.6	.617
Independent in 3 functions	9	5.7	5	6.3	4	5.1	.500
Independent in 2 functions	37	23.4	22	27.8	15	19.0	.130
Independent in 1 function	39	24.7	20	25.3	19	24.1	.500
Dependent in all 6 functions	40	25.3	14	17.7	26	32.9	.022
Totals	158	100.0	79	100.0	79	100.0	
					χ^2=5.49 df=5		(p=.359)[5]

[1]Percentages are based on 79 hospital patients and 79 nursing home patients, or 158 total patients.

[2]Values are the exact p-values, or significance levels, associated with Fisher's Exact Test for the difference between two proportions.

[3]Significance level is based on the sign test for overall differences.

[4]The Index is the modified Katz Index based on the activities of daily living of bathing, dressing, toileting, transfer, continence, and feeding.

[5]The categories of independence in 3 and 4 functions were combined to compute the chi-square statistic due to expected cell sizes of less than 5.

Source: Long-Term Care Survey

generally more independent than the comparison nursing home patients.

Swing-bed hospitals and nursing homes were compared on the ADL Index, a measure of overall patient independence on six of the ADL classes: bathing, dressing, toileting, transfer, continence (urine and bowel), and feeding. The majority of patients are in the most dependent categories: 25.3% are dependent in all 6 functions, 50.0% are dependent in 5 or more functions, and 73.4% dependent in 4 or more functions. No significant overall differences between the hospitals and nursing homes are evident on this indicator of functional ability. There is also no significant difference between the profiles when only skilled level patients are tested.

d. Additional Patient Characteristics: Hospital and skilled nursing facility patients were compared on the basis of a number of characteristics. A majority of the characteristics compared in Table V.9 are significantly different (at the .10 level) between the two groups of patients. Hospitals have significantly more male patients, and fewer patients with uncompensated speech impairments or inappropriate behavior patterns. In terms of the intensity variables, the hospital patients have significantly fewer sensory impairment and psychosocial problems, but there is no significant difference in the number of nursing and medically-oriented problems. Hospital patients also exhibit significantly more physical improvement and psychological improvement or stabilization since admission to current status. Finally, hospitals have a higher percentage of short-term and rehabilitation patients and fewer skilled level patients (the last being a result of the sample selection process).

Discriminant analysis was used to examine the differences between facility types based on these variables. The discriminant function explains 38.6% of the variation in facility type (i.e., the square of the canonical correlation associated with the discriminant function is .386) between the hospitals and the nursing homes ($p<.001$). This suggests that there are significant overall differences between the swing-bed hospitals and comparison nursing homes in terms of the case mix variables presented in Table V.9.

2. Quality of Care

The quality of care findings are based primarily on the process quality scores at the facility, patient, problem, and service levels. Additional results involve process quality measures based on physician visits and written discharge plans, as well as structural quality measures based on the presence or absence of six selected long-term care services.

a. Facility Quality Scores: As described in Section C.2, the two different facility scores analyzed in this study were calculated by averaging the quality scores for all sample patients in each facility and also by averaging the problem scores for all patient problems identified in the facility. The former are referred to as facility (patient) quality scores, the latter as facility (problem) scores.

TABLE V.9:

Comparison of Mean Values for Patient Characteristics by Type of Facility.

Patient Characteristics	Mean Values for Patient Characteristics: All Facilities Combined	Experimental Hospitals	Comparison Nursing Homes	Signif. Level
Demographic Characteristics:				
Age	79.2	79.5	78.9	.696[1]
Sex (% male)	38.6	45.6	31.6	.051[2]
Marital status (% married)	34.4	38.5	30.4	.185[2]
Sensory Impairments:				
Vision (% w/uncompensated impairment)	13.0	9.2	17.1	.120[2]
Hearing (% w/uncompensated impairment)	4.8	3.9	5.6	.462[2]
Speech (% w/uncompensated impairment)	21.5	13.9	29.1	.016[2]
Psychological/Social Status:				
Behavior (% w/inappropriate behavior)	30.4	22.8	38.0	.028[2]
Family (% w/family support)	91.8	93.7	89.9	.282[2]
Medical Condition:				
No. of sensory impairments	.335	.241	.430	.026[1]
No. of psychosocial problems	.873	.722	1.025	.052[1]
No. of nursing-oriented problems	2.30	2.22	2.38	.408[1]
No. of medically-oriented problems	.367	.380	.354	.776[1]
Physical status (% improved since admission)	54.4	65.8	43.0	.003[2]
Psychological status (% stable or improved since admission)	81.0	87.3	74.7	.033[2]
Level and Type of Care:				
Duration of care (% short-term, less than 30 days)	23.4	38.0	8.9	<.001[2]
Type of care (% rehabilitaton)	52.5	58.2	46.8	.101[2]
Level of care (% skilled)	75.9	62.0	89.9	<.001[2]

[1]Value is the exact p-value, or significance level, associated with the two-sample t-test for mean differences.

[2]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Source: Long-Term Care Survey

TABLE V.10:

Facility (Patient) Quality Scores by Type of Facility.

Facility (Patient) Quality Scores	All Facilities Combined	Swing-Bed Hospitals	Comparison Nursing Homes
Mean (p=.530)[1]	67.0	66.3	68.4
St. Dev.	10.0	11.5	8.3
Median	66.4	65.3	69.0
Min.-Max.	41.2-98.2	41.2-93.2	53.3-82.6
No. of Facilities	45	30	15

Intervals[2]	Swing-Bed Hospitals N	Swing-Bed Hospitals %	Comparison Nursing Homes N	Comparison Nursing Homes %
41.2 - 58.9	7	23.3	2	13.3
59.0 - 65.2	6	20.0	3	20.0
65.3 - 68.6	8	26.7	1	6.7
68.7 - 76.4	3	10.0	6	40.0
76.5 - 98.2	6	20.0	3	20.0
Total (all facilities)	30	100.0	15	100.0

Fisher's Exact Test (p=.376)[3]

[1]The value in parentheses is the exact p-value, or significance level, associated with the two-sample t-test for mean differences. The Wilcoxon test resulted in a significance level of .279.

[2]The distribution of facility quality scores was divided into five intervals, each containing 20% of the 45 facilities.

[3]This is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions. For calculation of this test, the first two intervals were combined, as were the last three.

Source: Long-Term Care Survey

Table V.10 presents facility (patient) quality scores for the study hospitals and nursing homes. The mean facility (patient) score is 67.0 for all facilities combined, indicating that, on the average, the facilities received 67% of the maximum possible quality score. The mean facility (patient) score for the experimental hospitals is 66.3, compared with a mean facility (patient) score of 68.4 for the comparison nursing homes. While the average score for the nursing homes is higher than the average hospital score, the difference between the two is not significant at the .10 level (using the t-test and the Wilcoxon test).

The frequency distribution of facility (patient) scores for the hospitals and nursing homes combined was divided into five intervals, each containing 20% of the total number of facilities. Of the hospitals, 56.7% of the scores are in the top three categories compared to 66.7% of the nursing homes. The difference in the distributions is not significant at the .10 level.

Although not tabulated, the facility (problem) score results are similar to those reported for facility (patient) scores. The average score for all facilities is 66.6. For hospitals, the average is 65.8, and for nursing homes, 68.4. Again, while the average nursing home score is higher than the average hospital score, the difference is not significant. The distribution of scores across the five equal intervals is also similar and the difference in the distributions of hospital and nursing home scores is statistically insignificant.

While the two facility level scores were calculated differently to avoid possible bias due to the over-representation of patients with multiple problems, the final facility score results are highly similar. In addition, the Pearson correlation between the two variables is .989 (p=.001). Consequently, all subsequent analyses using facility level quality scores are performed using only the facility (patient) quality scores.

b. Patient Quality Scores: Summary statistics and the distribution of patient quality scores for the two groups of facilities are presented in Table V.11. The mean patient score for all facilities combined is 66.9. The mean patient score in the swing-bed hospitals is 65.4, and the mean in the nursing homes is slightly higher, 68.4. These are similar to the facility level scores in Table V.10. The difference between the average patient quality scores in the two types of facilities is of borderline significance based on the t-test (p=.134) and Wilcoxon test (p=.091).

Patient level quality scores were also analyzed by level of care. When only skilled level patients are considered, there are no significant differences in quality between swing-bed and nursing home patients (p=.552). For swing-bed patients only, the mean patient score for skilled patients, 68.3, is significantly higher than the mean score of 60.3 for intermediate level patients (p=.010).

TABLE V.11:

Patient Quality Scores by Type of Facility.

Patient Quality Scores	All Facilities Combined	Swing-Bed Hospitals	Comparison Nursing Homes
Mean (p=.134)[1]	66.9	65.4	68.4
St. Dev.	12.2	13.1	11.2
Median	66.9	65.3	69.1
Min.-Max.	36.8-98.2	36.8-98.2	40.0-97.0
No. of Patients[2]	154	75	79

Intervals[3]	Swing-Bed Hospitals N	Swing-Bed Hospitals %	Comparison Nursing Homes N	Comparison Nursing Homes %
36.8 - 56.0	19	25.3	11	13.9
56.1 - 63.1	15	20.0	16	20.3
63.2 - 69.8	17	22.7	14	17.7
69.9 - 77.8	8	10.7	23	29.1
77.9 - 98.2	16	21.3	15	19.0
Total (all patients)[2]	75	100.0	79	100.0

χ^2=9.65 df=4 (p=.047)

[1]The value in parentheses is the exact p-value, or significance level, associated with the two sample t-test for mean differences. The Wilcoxon test resulted in a significance level of .091.

[2]Totals differ from the sample size reported earlier due to removal of personal care patients and patients with no reported problems.

[3]The distribution of patient quality scores was divided into five intervals, each containing approximately 20% of the 154 patients.

Source: Long-Term Care Survey

The patient score categories in Table V.11 were obtained by dividing the total range of scores (36.8 to 98.2) into five intervals in the same manner as in Table V.10. As would be expected from the mean values, the distribution of nursing home patients is weighted toward the higher categories relative to the distribution of hospital patients. While the difference between the mean scores is marginally significant, the difference in the distribution of patient scores for the two facility types is significant (p=.047).

c. Problem Quality Scores: Table V.12 presents a comparison of the study hospitals and nursing homes in terms of problem-level quality scores (for all 27 patient problems combined). The average problem score for all problems is 66.4, with a mean of 64.0 for the swing-bed hospitals and 68.4 for the nursing homes. The average scores at the problem level are similar to those observed at the facility and patient levels. At this level, however, the mean difference between the two facility types is statistically significant (p=.002). The frequency distribution constructed using the same procedure used for facility and patient scores shows significantly more nursing home problem scores in the higher categories than hospital scores (p=.055).

The mean difference in problem level quality between the swing-bed hospitals and comparison nursing homes remains significant when only skilled level patients are evaluated (p=.018). For the hospitals alone, the mean problem quality score for skilled level patients, 65.4, is significantly higher than the mean score of 60.6 for intermediate patients (p=.052).

Differences in problem scores between primary and secondary problems were also investigated. Respondents to the Long-Term Care Survey were asked to choose one of the patient problems identified during the interview as the patient's primary problem. All other problems were considered "secondary" for purposes of this analysis. It was hypothesized that primary problems might receive more attention from the facility staff and, as a result, that the average problem score for primary problems would be higher than for secondary problems. A total of 144 primary problems were recorded among all patient problems identified. For hospitals, the average primary problem score is 69.4, compared with 67.5 for secondary problems. In nursing homes, the corresponding values are 75.8 and 73.3. In neither case are the differences statistically significant (p=.177 for hospitals and p=.389 for nursing homes, using t-tests).

To assess problem-level quality in greater depth, the problem scores for each of the 27 patient problems were examined separately. Table V.13 presents descriptive statistics for each problem individually and by general problem groupings. Individual problems are not considered in this discussion when the number of cases is less than three. For both facility groups combined, the average problem scores for the individual problems range from 49.4 to 80.7. The standard deviations for each problem within each facility type are generally lower than the standard deviation for all problems combined (Table V.12), indica-

TABLE V.12:

Problem Quality Scores by Type of Facility (All Problems Combined).

Problem Quality Scores	All Facilities Combined	Swing-Bed Hospitals	Comparison Nursing Homes
Mean (p=.002)[1]	66.4	64.0	68.4
St. Dev.	16.7	18.0	15.3
Median	67.9	65.2	68.8
Min.-Max.	16.5-100.0	16.5-100.0	28.6-99.1
Number of problems[2]	588	268	320

Intervals[3]	Swing-Bed Hospitals N	Swing-Bed Hospitals %	Comparison Nursing Homes N	Comparison Nursing Homes %
16.5 - 52.7	66	24.6	51	15.9
52.8 - 64.0	57	21.3	61	19.1
64.1 - 72.3	49	18.3	68	21.2
72.4 - 79.8	43	16.0	69	21.6
79.9 - 100.0	53	19.8	71	22.2
Total (all problems)[2]	268	100.0	320	100.0

χ^2=9.27 df=4 (p=.055)

[1]The value in parentheses is the exact p-value, or significance level, associated with the two sample t-test for mean differerences. The Wilcoxon test resulted in a significance level of of .008.

[2]Totals differ from the sample size reported earlier due to missing data and the elimination of problems attributable to personal care patients.

[3]The distribution of problem quality scores was divided into five intervals, each containing approximately 20% of the 588 problems.

Source: Long-Term Care Survey

TABLE V.13:

Problem Quality Scores for Each Individual Patient Problem by Type of Facility.

Patient Problems	All Facilities Combined	Swing-Bed Hospitals	Comparison Nursing Homes
Sensory Impairments:	68.6	64.8	70.5
Impaired vision			
Mean	69.4	71.6	67.9
St. Dev.	15.4	20.5	13.0
Number	10	4	6
Impaired hearing			
Mean	62.2	58.1	63.9
St. Dev.	12.9	8.1	14.8
Number	7	2	5
Mechanical speech disorder			
Number	0	0	0
Neurological speech disorder			
Mean	69.7	63.6	72.8
St. Dev.	17.2	22.2	13.7
Number	33	11	22
Nursing-Oriented Problems:	70.0	69.0	70.8
Primary skin condition			
Mean (p=.081)[1]	78.3	73.7	82.5
St. Dev.	12.6	12.2	11.9
Number	25	12	13
Secondary skin condition			
Mean	74.7	73.7	77.3
St. Dev.	10.0	10.5	8.5
Number	32	23	9
Incontinence of urine			
Mean (p=.047)[1]	66.8	63.2	69.3
St. Dev.	11.9	10.7	12.2
Number	62	26	36
Incontinence or bowels			
Mean	71.2	70.7	71.4
St. Dev.	10.3	10.9	10.1
Number	45	15	30
Constipation			
Mean	66.7	67.6	66.0
St. Dev.	13.2	14.7	12.1
Number	34	16	18
Orthopedic immobility			
Mean	68.5	67.1	70.0
St. Dev.	14.2	15.1	13.3
Number	65	34	31
Neurological immobility			
Mean	69.5	66.6	71.0
St. Dev.	16.0	16.4	16.2
Number	52	18	34
Pain			
Mean	71.1	72.7	70.0
St. Dev.	14.0	13.6	14.9
Number	42	26	16
Dehydration			
Mean	44.1	--	44.1
St. Dev.	22.0	—	22.0
Number	2	0	2
Medically-Oriented Problems:	68.1	68.9	67.2
Urinary tract infection			
Mean	70.2	65.0	73.9
St. Dev.	16.4	18.7	14.9
Number	12	5	7
Medically-Oriented Problems:	68.1	68.9	67.2
Malnutrition			
Mean	52.2	50.7	54.0
St. Dev.	18.5	15.3	24.4
Number	9	5	4
Shortness of Breath			
Mean	80.7	82.1	78.2
St. Dev.	8.4	10.0	5.8
Number	8	5	3
Dependent Edema			
Mean	66.3	72.7	53.5
St. Dev.	22.9	22.2	20.3
Number	15	10	5
Hypertension			
Mean	73.7	71.4	75.1
St. Dev.	12.8	19.9	8.9
Number	8	3	5
Psychosocial Problems:(p<.001)[1]	54.7	45.1	61.5
Confusion			
Mean	56.3	50.8	60.4
St. Dev.	18.3	18.6	17.4
Number	35	15	20
Depression (p=.045)[1]			
Mean	52.4	42.6	60.8
St. Dev.	16.7	15.3	13.7
Number	13	6	7
Anxiety			
Mean	57.3	33.0	65.3
St. Dev.	20.8	0	16.0
Number	4	1	3
Apathy			
Mean	61.0	43.1	78.9
St. Dev.	25.3	0	0
Number	2	1	1
Distruptive or disturbing behavior			
Mean	51.7	37.9	55.2
St. Dev.	19.0	13.5	19.0
Number	15	3	32
Difficult family situation			
Mean	57.9	65.0	57.0
St.Dev.	20.2	0	21.5
Number	9	1	8
Loneliness, isolation, lack of socialization			
Mean (p<.001)[1]	55.3	39.7	67.2
St. Dev.	21.0	15.7	16.2
Number	37	16	21
Terminal Illness			
Mean	49.4	46.9	56.8
St. Dev.	9.4	3.2	9.6
Number	8	6	2
Discharge Planning			
Mean	50.3	50.3	--
St. Dev.	26.7	26.7	--
Number	4	4	0

[1]Values are the exact p-values, or significance levels, associated with the two sample t-test for mean differences. P-values are given for differences significant at the .10 level or less. The Wilcoxon test was significant at the .10 level for the same four individual problems: primary skin condition (p=.092); incontinence of urine (p=.060); depression (p=.063); and loneliness, isolation, lack of socialization (p<.001).

Source: Long-Term Care Survey

ting the existence of differences in the quality of long-term care provided for different problems. The four problems with the highest average problem scores are shortness of breath (80.7), primary and secondary skin conditions (78.3 and 74.7), and hypertension (73.7), all of which are nursing or medically-oriented problems. The four lowest average problem scores are associated with terminal illness (49.4), discharge planning (50.3), disruptive or disturbing behavior (51.7), and malnutrition (52.2), which are psychosocial or medically-oriented problems.

The range of problem quality scores in the swing-bed hospitals (37.9 to 82.1) is larger than that for the nursing home sample (53.5 to 82.5). Further, the standard deviations for problem scores in the hospitals tend to be larger than those for problem scores in the nursing homes, indicating that the variation in quality by problem type is more pronounced in the swing-bed hospitals than in the comparison nursing homes.

The problems with the highest scores in both groups are the same as for the combined sample. The problems with the lowest scores differ between the hospitals and the nursing homes. The four lowest average problem scores for the hospitals are disruptive or disturbing behavior (37.9), loneliness, isolation, and lack of socialization (39.7), depression (42.6), and terminal illness (46.9). The four lowest in the nursing homes are dependent edema (53.5), malnutrition (54.0), disruptive or disturbing behavior (55.2), and difficult family situation (57.0).

Among the 19 problems which have three or more occurrences in both hospitals and nursing homes combined, hospital scores exceed nursing home scores for only five problems, while the nursing home scores exceed the average problem score for experimental hospitals for the remaining 14 problems. Using the sign test, under the assumption that the quality of care is the same for nursing homes and hospitals, the probability of finding five (or fewer) negative differences between average scores in the two groups of facilities is less than .05 using the sign test. This indicates that the difference across facility problem profiles is significant, with nursing homes providing consistently higher quality.

Although there are no significant differences between the hospitals and nursing homes in the overall problem categories of sensory impairments, nursing-oriented, and medically-oriented problems, the hospitals have significantly lower psychosocial problem quality scores. The average of psychosocial problem scores for hospital patients is 45.1, compared with an average of 61.5 for nursing home patients. There are also significant differences in individual problem scores between hospitals and nursing homes for four problems: primary skin condition; incontinence of urine; depression; and loneliness, isolation, and lack of socialization. In each case the average problem score for nursing homes is greater than that for the swing-bed hospitals. The Wilcoxon test identifies the same four significant differences as the t-test.

The differences between hospital and nursing home patients for the general problem categories remain the same when only skilled level patients are considered. Psychosocial problems have significantly lower quality scores in the hospitals than in the nursing homes ($p=.001$). The following individual psychosocial problem scores for skilled patients are significantly lower for swing-bed hospitals: depression ($p=.035$); loneliness, isolation, and lack of socialization ($p<.001$); and disruptive or disturbing behavior ($p=.089$). For the hospitals considered separately, skilled level patients receive significantly higher quality care than intermediate patients only for nursing-oriented problems ($p=.017$). There is an insufficient hospital sample size on many problems for further analysis of individual problems by level of care.

d. Service Quality Scores: Service scores range in value between zero and 100 and measure the adequacy of the manner in which services are provided (as discussed in Section C.2). Table V.14 indicates that the mean service score for all services provided in both groups of facilities is 71.4. The average score for the experimental hospitals is 71.1, with the comparison nursing homes averaging 71.6.[11] All standard deviations are much larger relative to the means than is the case for the problem, patient, and facility level scores, since the service quality scores are clustered at the extreme values of zero and 100. Further, the service score distribution is bimodal, with approximately 84% of all service scores at the minimum or maximum.

Although there are no significant differences between the hospital and nursing home scores (using the t-test for mean differences), the chi-square test, a more appropriate test given the discrete nature of the distribution of the service quality scores, indicates significant distributional differences ($p<.001$).

In order to determine general areas of strength and weakness in the provision of services to long-term care patients, each of the 151 unique services specified in the 27 service criteria sets was placed in one of the 14 general service categories shown in Table V.15.[12]

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[11]The service scores are not weighted, since weights were applied in the course of aggregating service scores to the problem level. This accounts for the differences between the overall mean facility, patient, and problem scores (which are approximately 67.0) and the overall mean service score (which, as indicated above, is 71.1). Thus, the service weights exerted a downward influence on the quality scores for the three higher levels of analysis, indicating in a general sense that hospitals and nursing homes provide the less important services better than the more important services.

[12]Appendix D identifies the individual patient services which make up each service category.

TABLE V.14:

Service Quality Scores by Type of Facility.

	All Facilities Combined	Experimental Hospitals	Comparison Nursing Homes
Mean (p=.649)[1]	71.4	71.1	71.6
St. Dev.	42.4	43.1	41.8
Median	100.0	100.0	100.0
Min.-Max.	0-100	0-100	0-100
Number of services	6859	3314	3545

Service Quality Scores[2]	All Facilities Combined N	All Facilities Combined %	Experimental Hospitals N	Experimental Hospitals %	Comparison Nursing Homes N	Comparison Nursing Homes %
0	1738	25.3	871	26.3	867	24.5
45	18	.3	4	.1	14	.4
50	29	.4	10	.3	19	.6
55	2	.0	1	.0	1	.0
60	34	.5	10	.3	24	.7
70	202	2.9	60	1.8	142	4.0
75	31	.5	13	.4	18	.5
80	392	5.7	178	5.4	214	6.0
85	17	.2	6	.2	11	.3
90	386	5.6	169	5.1	217	6.1
100	4010	58.5	1992	60.1	2018	56.9
Total (all services)	6859	100.0	3314	100.0	3545	100.0

χ^2=51.2 df=9 (p<.001)[2]

[1]Value in parentheses is the exact p-value, or significance level, associated with the two sample t-test for mean differences. As indicated in the text, however, the chi-square test is the most appropriate test in this situation. The significance level of the t-test is included here for purposes of comparison with earlier tables.

[2]Service quality score values are raw scores, not intervals. Since the 55 category had a low frequency, the 50 and 55 categories were combined for calculation of the chi-square statistic.

Source: Long-Term Care Survey

TABLE V.15:

Service Quality Scores by Service Category for Experimental Hospitals and Comparison Nursing Homes.

Service Category	All Facilities Combined	Experimental Hospitals	Comparison Nursing Homes
	Service Quality Scores		
Social-recreational			
Mean (p<.001)[1]	71.8	60.5	79.1
St. Dev.	40.8	45.5	35.7
Number of services	404	159	245
Therapeutic-mental health			
Mean (p=.014)[1]	64.1	60.0	66.7
St. Dev.	45.9	47.5	44.8
Number of services	664	262	402
Physical and Occupation therapy			
Mean (p=.037)[1]	74.0	73.2	74.7
St. Dev.	38.7	39.9	37.4
Number of services	1218	613	605
Speech therapy			
Mean (p=.189)[1]	79.7	72.0	83.7
St. Dev.	40.5	45.8	37.3
Number of services	74	25	49
Inhalation therapy			
Mean (p=.667)[1]	94.4	91.7	100.0
St. Dev.	23.6	28.9	0
Number of services	18	12	6
Sensory compensation			
Mean (p=.369)[1]	50.0	57.1	45.8
St. Dev.	50.7	51.4	50.9
Number of services	38	14	24
Laboratory			
Mean (p<.001)[1]	69.7	80.0	58.3
St. Dev.	46.0	40.1	49.4
Number of services	419	220	199

Service Category	All Facilities Combined	Experimental Hospitals	Comparison Nursing Homes
	Service Quality Scores		
EKG			
Mean (p=.114)[1]	62.5	73.7	46.2
St. Dev.	49.2	45.2	51.9
Number of services	32	19	13
Radiology			
Mean (p=.324)[1]	93.6	95.0	91.7
St. Dev.	24.6	21.9	27.9
Number of services	140	80	60
Professional nursing			
Mean (p<.001)[1]	55.1	48.0	61.4
St. Dev.	45.3	46.4	43.4
Number of services	729	345	384
Non-professional nursing			
Mean (p=.019)[1]	79.4	81.5	77.2
St. Dev.	37.5	36.0	38.9
Number of services	1730	873	857
Physician			
Mean (p<.001)[1]	52.6	48.0	56.6
St. Dev.	47.2	49.2	45.0
Number of services	494	230	264
Dietary			
Mean (p=.361)[1]	64.0	62.4	65.7
St. Dev.	48.1	48.7	47.7
Number of services	211	109	102
Pharmacy			
Mean (p=.512)[1]	84.9	85.0	84.8
St. Dev.	35.8	35.8	36.0
Number of services	688	353	355

[1]The value in parentheses is the p-value, or significance level, associated with the chi-square test or Fisher's Exact Test. Some frequencies were combined within service categories to ensure expected cell sizes greater than five. Degrees of freedom ranged from one to four.

Source: Long-Term Care Survey

The table presents average service scores within each service category for experimental hospitals and comparison nursing homes. Across all facilities, inhalation therapy services have the highest average score (94.4), followed by radiology (93.6) and pharmacy (84.9).

The lowest average service scores are recorded for sensory compensation (50.0), physician (52.6), and professional nursing services (55.1). The same services have the highest and lowest average scores in both types of facilities, with one exception. In the nursing homes, the average score for EKG services is lower than the score for professional nursing services.

Statistically significant differences occur between the mean service quality scores for experimental hospitals and comparison nursing homes in seven of the 14 service categories (using the chi-square test). Average service scores for nursing homes are significantly higher than for swing-bed hospitals in five service categories: social-recreational; therapeutic-mental health; physical and occupational therapies; professional nursing; and physician services. The service quality scores for lab and non-professional nursing services are significantly higher in the swing-bed hospitals than the comparison nursing homes. When skilled patients were considered separately, these differences between facility types remained except for physical and occupational therapies, for which the hospitals have significantly higher quality scores.

The four service categories in which the swing-bed hospitals provided consistently poorer quality care were analyzed by patient problem areas in order to determine the types of problems for which these services were deficient. The social-recreational and therapeutic-mental health service scores were significantly lower for psychosocial problems; professional nursing services were lower for nursing-oriented and psychosocial problems; and physician services were deficient for both nursing and medically-oriented problems.

An additional analysis of hospital patients examined the differences in mean service scores between skilled and intermediate levels of care for each of the 14 service categories. There are significant differences (using the chi-square test) in four service categories: physical therapy ($p<.001$); laboratory ($p=.035$); professional nursing ($p=.001$); and pharmacy ($p=.002$). In all cases, skilled level patients have higher average scores than intermediate level patients.

e. Quality Comparisons: As mentioned previously, the difference in average patient quality scores between hospital and nursing home patients is almost significant at the .10 level (Table V.11). The purpose of this analysis is to demonstrate the extent to which patient level quality scores are related to differences in facility type when controls for case mix are introduced (that is, the influence of case mix differences between the two types of facilities is eliminated). Discriminant analysis, using facility type as the dependent variable and quality and case mix as the independent variables, was used for

this purpose. The first discriminant function used quality alone as the independent variable, the second used case mix alone, and the third used both case mix and quality. The explanatory power of quality was then compared to the incremental explanatory power of quality when added to case mix. This analysis was performed at the patient level since the case mix variables are patient characteristics and thus most relevent at this level.

All the case mix variables identified in Section D.1 were considered for inclusion in this analysis, including admitting diagnoses, long-term care problems, ADL characteristics, the ADL Index, and additional patient characteristics (see Tables V.6 to V.9). Admitting diagnoses and the individual ADL categories were omitted because the long-term care problems and the ADL Index were considered better indicators of the medical condition and functional status of long-term care patients. Variables which were then considered as independent variables in the initial discriminant function analysis were those which were significantly different between the hospitals and the nursing homes. The intensity variables (numbers of problems associated with the four major problem categories) were included as potential independent variables regardless of significance, owing to their conceptual importance as measures of overall resource consumption.

The results of the discriminant analyses are presented in Table V.16. The first discriminant function using quality alone as the independent variable, explains only 1.4% of the difference between type of facility. This is of borderline significance (p=.134), verifying the result presented earlier in Table V.11. The second function was derived after assessing several potential case mix factors, and indicates that case mix explains a much larger portion of the variation, 33.8%. The most important discriminators between facilities are duration of care and level of care. In addition, the patient's sex and the presence of problems in the areas of secondary skin condition, pain, and disruptive and disturbing behavior are also discriminators. In function three, with both quality and case mix as independent variables, only 35.2% of the variation in facility type is explained. These results indicate that the difference in quality scores is still of marginal significance when case mix variables are controlled.

f. <u>Frequency of Physician Visits</u>: Table V.17 indicates that the frequency of visits to patients is greater in the swing-bed hospitals than the comparison nursing homes. Over 80% of the hospital patients were routinely seen daily or weekly by a physician, while only 16.5% of the nursing home patients were seen with similar frequency. The difference in the distribution of physician visits between the two groups is statistically significant.

As shown earlier in Table V.15, despite the greater frequency of physician visits in swing-bed hospitals, the average service score for physician services is significantly lower (p<.001) in the hospitals than in the nursing homes (48.0 vs. 56.6), indicating that while physicians may visit hospital patients more often, they do not carry out

TABLE V.16:

Discriminant Analysis Examining Facility Type Differences Using Case Mix Factors and Patient Quality Scores.

Groups

Group A - Experimental hospital patients (N=75)
Group B - Comparison nursing home patients (N=79)

	Discriminant Function		
	Function 1 (Quality Only)	Function 2 (Case Mix Only)	Function 3 (Quality and Case Mix)
Squared canonical correlation	.014	.338	.352
Wilk's lambda	.985	.662	.647
Chi-square	2.25 (p=.134)	61.5 (p<.001)	64.7 (p<.001)
Percentage of cases correctly classified	56.5%	78.5%	77.9%
Independent Variables[1]	Standardized Coefficients		
Patient quality score	1.00	--	-.279
Patient problem - secondary skin condition[2]	--	-.337	.329
Patient problem - pain[2]	--	-.357	.345
Patient problem - disruptive, disturbing behavior[2]	--	.320	-.367
Sex (male)[2]	--	-.255	.272
Duration of care (short-term)[2]	--	-.630	.666
Level of care (skilled)[2]	--	.644	-.542

[1]The relationships between these variables and facility type is found in Tables V.7, V.9 and V.11.

[2]This is a dichotomous variable with a value of one indicating the presence of the attribute and a value of zero indicating its absence.

Source: Long-Term Care Survey

the activities needed for quality care as well as physicians caring for nursing home patients.

A comparison of swing-bed hospitals and comparison nursing homes in terms of skilled care patients only indicates that the frequency of physician visits is again greater in the hospitals than the nursing homes, with the difference between the two types of facilities more pronounced than for all patients combined. Approximately 98% of the skilled care hospital patients were seen daily or weekly, compared to 18.3% of the nursing home skilled level patients. As with the profiles in Table V.17, the hospital/nursing home difference in the fre-

TABLE V.17:

Frequency and Percentage Distribution of Patients by Routine Frequency of Physician Visits and Type of Facility.

	Frequency and Percentage of Patients			
	Experimental Hospitals		Comparison Nursing Homes	
Routine Frequency of Physician Visits	N	%	N	%
Daily	26	33.3	1	1.3
Weekly	41	52.6	12	15.2
Monthly	6	7.7	47	59.5
Every two months	4	5.1	8	10.1
Quarterly or less	1	1.3	5	6.3
No visits	0	--	6	7.6
Total	78	100.0	79	100.0

$\chi^2=78.90$ df=3 ($p<.001$)[1]

[1]For calculation of the chi-square statistic, the last three categories were combined due to expected cell sizes less than 5.

Source: Long-Term Care Survey

quency of physician visits to skilled level patients is highly significant ($p<.001$). A comparison was not done for intermediate level patients since there were only eight such patients in the comparison nursing homes.

Since Medicare regulations require physician visits every 30 days and Medicaid regulations in the three states prescribe no minimum frequency for physician visits to beneficiaries, the possibility that the frequency of physician visits could vary due to payer type was investigated. While Medicaid patients were not used due to the small number (4) of Medicaid study patients in the swing-bed hospitals, Medicare and private pay patients in each group of facilities were compared. In the hospitals, 100% of all Medicare swing-bed patients were seen by a physician weekly or more often, compared to 39.3% of the nursing home Medicare patients. Since Medicare long-term care patients are by definition skilled care patients, this result further substantiates the finding that level of care does not account for the differences between the two types of facilities. Among private pay (non-federal) patients, for whom there are no regulatory standards, 91.4% of the hospital patients were visited by a physician weekly or more often, as opposed to 15.4% of the nursing home patients. Within both payer groups, the differences between experimental hospitals and comparison nursing homes are significant ($p<.001$ for Medicare patients and $p=.003$ for private pay patients).

Another potential explanatory factor is case mix differences between swing-bed and nursing home patients. While no direct test of this hypothesis was conducted, a review of differences between the two groups of facilities in the case mix measures reported in this chapter indicates that conditions requiring more frequent physician visits, as measured by the number of medically-oriented problems, are not significantly more frequent in swing-bed hospitals than in comparison nursing homes.

g. Written Discharge Plans: Written patient discharge plans can be regarded as a reflection of a facility's commitment to patient rehabilitation and return to the community. It is important to note, however, that the Medicare/Medicaid discharge planning requirement for skilled nursing facilities was waived for the swing-bed hospitals as a part of the experiment. A comparison of the two types of facilities in terms of the presence of written discharge plans is shown in Table V.18. In swing-bed hospitals, written discharge plans were present in patient charts for 27.8% of the patients covered by the Long-Term Care Survey. For nursing homes, the corresponding percentage was 63.3%. The greater frequency of discharge plans for nursing home patients is statistically significant ($p<.001$).

Since the observed difference could be linked with the Medicare/Medicaid requirement that certified providers of long-term care develop a discharge plan for their beneficiaries, Medicare and private pay patients in the two groups of facilities were examined separately. As in the prior analysis, Medicaid was not included due to an insufficient

number of patients. The significant difference between the two groups of facilities persists (p=.001) when Medicare and private pay patients are considered separately, however. Among Medicare patients, 78.6% of the nursing home patients had written discharge plans, compared with 31.1% of the swing-bed hospital patients. The corresponding figures for private pay patients were 76.9% and 20.7%, respectively.

Within the swing-bed hospitals, the effect of prior long-term care experience on the presence of discharge plans was also investigated to determine whether hospitals with prior long-term care experience were more likely to prepare written discharge plans for swing-bed patients. In swing-bed hospitals with prior experience, 35.7% of the patients

TABLE V.18:

Frequency and Percentage Distribution of Patients by Presence of Written Discharge Plan and Type of Facility.

	Frequency and Percentage of Patients			
	Experimental Hospitals		Comparison Nursing Homes	
Presence of Written Discharge Plan	N	%	N	%
Present	22	27.8	50	63.3
Not Present	57	72.2	29	36.7
Total	79	100.0	79	100.0

Fisher's Exact Test ($p<.001$)[1]

[1]Value is the exact p-value, or significance level, associated with Fisher's Exact Test for the difference between two proportions.

Source: Long-Term Care Survey

had written discharge plans, compared with 23.5% in hospitals without prior experience. The difference, however, is not statisticaly significant (p=.185).

The relative absence of discharge plans for swing-bed patients becomes more important when viewed in terms of differences in discharge prognosis between patients in the two groups of facilities. In swing-bed hospitals, 66.7% of the long-term care patients in the sample were expected to be discharged within three months of the survey interview date, compared with 18.2% of patients in the comparison nursing homes, a difference which is statistically significant (p<.001). Among swing-bed hospitals, 67.3% of the patients who were expected to be discharged within three months had no written discharge plan. In the comparison nursing homes the corresponding percentage was 14.3%, significantly less than the hospital percentage (p=.001 using Fisher's Exact Test).

h. Structural Measures of Quality: The structural measures of quality, listed in Table V.19, indicate the presence or absence of six long-term care services required by the Medicare/Medicaid conditions of participation for skilled nursing facilities, which were waived for the experiments. As indicated in Chapter III, the presence of long-term care services differs significantly between experimental hospitals with attached skilled nursing facilities and those without such facilities. Of those with attached skilled nursing facilities, 80% provide physical therapy, 70% provide speech therapy, 90% provide dental services, 30% provide occupational therapy, 80% provide social services, and 90% provide patient activities. The percentages for hospitals without atttached skilled nursing facilities are 49%, 10%, 1%, 47%, 30%, and 6%, respectively.

The analysis presented in Table V.19 compares the presence of these structure measures of quality between the experimental hospitals and the comparison skilled nursing facilities. In addiiton, a Structural Quality Index, equal to the number of services present (ranging in value from zero to six) was calculated for each facility in the analysis.

As described in Section C.2, the facility groups used in this analysis are different from those used in the process quality analyses just presented. All hospitals participating in the swing-bed experiments were comapred with a group of 33 Medicare-certified skilled nursing facilities (SNFs) in the three experimental states in terms of the presence or absence of each of the six services and the Structural Quality Index value. Table V.19 indicates that the most frequently available services in the swing-bed hospitals are physical therapy (provided in 53.1% of the hospitals) and dental services (51.9%). The least frequently provided services are occupational therapy (4.9%) and patient activities (16.0%). Among the SNFs, over 90% of the facilities provided physical therapy, dental services, social services, and patient activities. Speech and occupational therapy were provided less often, possibly because SNFs are only required to provide these services if they provide care to patients who need the services.

TABLE V.19:

Frequency and Percentage of Facilities Meeting Waived Conditions of Participation by Type of Facility.

Condition of Participation	Experimental Hospitals N	Experimental Hospitals %	Comparison SNFs N	Comparison SNFs %	Signif. Level[2]
	Frequency and Percentage of Facilities[1]				
Physical therapy	43	53.1	33	100.0	<.001
Speech therapy	14	17.3	19	57.6	<.001
Occupational therapy	4	4.9	10	30.3	<.001
Dental services	42	51.9	31	93.9	<.001
Social services	29	35.8	32	97.0	<.001
Patient activities	13	16.0	32	97.0	<.001
Structural Quality Index					
Mean	1.79		4.78		.001[3]
St. Dev.	1.53		.87		
Number of facilities	81		33		

[1]Percentages are based on 81 swing-bed hospitals (one hospital refused the interview) and 33 Medicare-certified comparison SNFs.

[2]Values are exact p-values, or significance levels, associated with Fisher's Exact Test for the difference between two proportions.

[3]Value is the exact p-value, or significance level, associated with the two-sample t-test for mean differences. The Wilcoxon test yielded a significance level less than .001.

Source: Provider Survey for Hospital Administrators and the Medicare/ Medicaid Skilled Nursing Facility Survey Report

Comparing the two groups of facilities, a significantly higher percentage of SNFs offer each of the six services. The greatest differences are in the areas of patient activities (a difference of 81 percentage points), social services (61 percentage points), and physical therapy (47 percentage points). The difference in mean values for the Structural Quality Index, 1.79 for the hospitals and 4.78 for the SNFs, is also statistically significant (p .001).

3. Correlates of Quality

As mentioned earlier, the correlates of quality findings cover two analytic areas. The first compares the swing-bed hospitals and nursing homes in terms of the differences in the correlates of quality between each facility type. The second is a detailed examination of the factors related to quality of care within the swing-bed hospitals alone.

a. Comparison of Quality Correlates: This analysis identifies a common set of case mix factors related to quality in either the swing-bed hospitals or comparison nursing homes and compares the differential effect of each factor in each type of facility. Since this analysis focuses on those variables which are common to both the hospital and the nursing home patients, it was initially restricted to the case mix variables: diagnoses, problems, ADLs, the ADL Index, the patient characteristics (Tables V.6, V.7, V.8 and V.9). Further, as with the discriminant analysis presented earlier, admitting diagnoses and the individual ADL scores were eliminated because the long-term care problem indicators and the ADL Index provide more appropriate measures of a patient's medical condition and functional ability. The case mix variables included in the comparison were those from the problem, ADL Index, and patient characteristic group which were significantly correlated with quality in either the hospitals or the comparison nursing homes. In addition, the four intensity variables measuring the number of sensory impairments, psychosocial problems, nursing-oriented problems, and medically-oriented problems, were included regardless of statistical significance, on the basis of their potential to represent the patient's overall resource consumption needs. The list of independent variables which resulted and their correlations with quality is presented in Table V.20.

This table demonstrates the differences in the correlates of quality for the swing-bed hospital and the nursing home patients. For instance, inappropriate patient behavior is a significant negative correlate of quality only in the nursing homes. The long-term care problems of disruptive or disturbing behavior and loneliness, isolation, and lack of socialization as well as the duration and type of care, are significantly correlated with quality in the hospitals but not the nursing homes. Furthermore, the presence of dependent edema is positively correlated with quality in the hospitals and negatively correlated with quality in the nursing homes.

In the first step of the analysis, regression analysis was used to analyze the hospital and nursing home patient samples separately, in order

TABLE V.20:

Correlations Between Patient Quality Scores and Selected Case Mix Measures for the Experimental Hospitals and Comparison Nursing Homes.

Patient Characteristics	Correlation with Patient Quality Scores[1]			
	Experimental Hospitals		Comparison Nursing Homes	
	Correlation (n=75)	Significance	Correlation (n=79)	Significance
Age	-.227	.050	-.207	.069
Behavior (inappropriate)[2]	-.092	.423	-.247	.028
Problem - dependent edema[2]	.212	.069	-.214	.059
Problem - confusion[2]	-.259	.025	-.235	.037
Problem - disruptive or disturbing behavior[2]	-.259	.025	-.179	.115
Problem - loneliness, isolation, lack of socialization[2]	-.320	.005	-.114	.317
No. of sensory impairments	.049	.678	.096	.402
No. of psychosocial problems	-.422	.001	-.214	.059
No. of nursing-oriented problems	-.134	.252	.087	.448
No. of medically-oriented problems	-.098	.404	.016	.890
Duration of care (short-term)[2]	.298	.009	.149	.192
Type of care (rehabilitation)[2]	.230	.047	.180	.113
Level of care (skilled)[2]	.295	.010	.344	.002
ADL Index (Independent in 5 activities)[2]	.238	.040	-.045	.697

[1]Correlations are ordinary product-moment correlations, significance is based on the t-test.

[2]This is a dichotomous variable with a value of one indicating the presence of the attribute and a value of zero indicating its absence.

Source: Long-Term Care Survey

TABLE V.21:

Comparison of the Correlates of Patient Quality for the Experimental Hospitals and the Comparison Nursing Homes.

Dependent Variable: Patient Quality Score

	Experimental Hospitals	Comparison Nursing Homes
R^2	.432	.235
No. of cases	75	79
F value	7.25 (p<.001)	3.08 (p=.007)
Mean of Dependent Variable	65.4	68.4
St. Dev. of Dependent Variable	13.1	11.2
Standard Error	10.4	10.3

	Experimental Hospitals		Comparison Nursing Homes		
Independent Variables	Regression Coefficient	Signif. of t	Regression Coefficient	Signif. of t	Signif. of Differences[1]
No. of psychosocial problems	-7.68	<.001	-.71	.620	.002
Level of care (skilled)[2]	8.45	.010	12.43	.008	.472
Patient problem - dependent edema[2]	6.73	.086	-3.36	.454	.087
Age	-.33	.022	-.05	.663	.126
No. of nursing-oriented problems	-2.16	.048	-.19	.858	.187
Patient problem - confusion[2]	2.98	.463	-5.31	.133	.121
Type of care (rehabilitation)[2]	2.16	.468	3.52	.153	.719
Constant	93.83	--	62.38	--	--

[1]Value is the exact p-value or significance level, associated with the t-test for differences in regression coefficients for independent samples.

[2]This is a dichotomous variable, with a value of one indicating the presence of the attribute and a value of zero indicating its absence.

Source: Long-Term Care Survey

to identify the most important correlates of quality in each setting. After analyzing a number of regression equations from the perspective of substantive meaning and statistical properties, an equation with five independent variables was selected as the most representative for the hospital patients. This equation explained 42.2% of the variation in quality and included the following independent variables (with regression coefficients and the significance of the t-value): number of psychosocial problewms (-7.23, p .001); skilled level of care (9.18, p=.001); problem-dependent edema (6.89, p=.066); age (-.272, p=.036); and the number of nursing-oriented problems (-2.22, p=.040). For the nursing homes, the most representative equation explained only 22.4% of the variation in quality and included three independent variables: skilled level of care (13.88, p .001); patient problem-confusion (-6.72, p=012); and rehabilitation care (3.89, p=.092). The fact that skilled level of care was the only case mix factor significantly related to quality in both groups of facilities supports the assumption that the basic relationships between quality and other variables differ between the two facility types.

In the second stage of the regression analysis, a combined list of all variables with significant regression coefficients in either of the equations in the first step were used in one regression equation and applied to each sample of patients separately. The results are shown in Table V.21. The comparison between the two equations shows that two of the independent variables have significantly different relationships to quality in the hospitals and nursing homes. The number of psychosocial problems has a significant negative regression coefficient in the swing-bed hospitals but is not significant for the nursing homes. This indicates that the swing-bed hospitals provide lower quality of care to patients who have such long-term care problems as confusion, depression, disruptive or disturbing behavior, or loneliness, isolation, and lack of socialization. It also provides a multivariate confirmation of the univariate results presented in Table V.13 which demonstrated that nursing homes generally provided higher quality care to patients with psychosocial problems. The presence of dependent edema is a positive indicator of quality for the hospitals but is also not significant for the nursing homes. Dependent edema is best explained as an indication of medically-oriented problems requiring a high proportion of physician and laboratory services. It is highly correlated with the variable measuring the number of medically-oriented problems (.604, p=.001). Although it is not significant on a univariate basis due to smaller frequencies, the difference in quality between hospitals and nursing homes is substantial for dependent edema, as seen in Table V.13. None of the other variables have significantly different regression coefficients in the two equations.

b. Correlates of Hospital Quality: As described in Section C.3, this analysis involves three steps. The first step evaluates quality in terms of community, hospital, and case mix factors not directly related to or determined by decisions, attitudes, patient care practices, staff qualifications, and services which pertain directly to hospital

TABLE V.22:

Correlations Between Patient Quality and Potential Explanatory Factors for the Experimental Hospitals.

	Correlation with Patient Quality Scores[1]	
Community Characteristics	Correlation (n=75)[2]	Significance
Population per square mile (1975)	.295	.010
Per capita income (1974)	.454	.001
Physicians per 10,000 population (1975)	.127	.278
Population over 65 years of age (1975)	.224	.054
Facility Structural and Staffing Characteristics		
Number of acute care beds	.403	.001
Acute care occupancy rate	.198	.105
Acute care average length of stay	.205	.133
Hospital expenses per inpatient day	.238	.050
Medicare percentage of acute care patient days	-.363	.002
Presence of hospital long-term care unit[3]	-.078	.525
RNs per inpatient day	.017	.884
Number of admitting physicians per acute care bed	-.039	.752
Patient Case Mix Characteristics		
(Refer to correlations in Table V.20)		
Swing-Bed Project Characteristics		
Nursing staff:		
Average nursing time per swing-bed patient day	.197	.110
Reluctance of nurses to provide long-term care[3]	.019	.872
Nurse training in rehabilitative nursing[3]	-.130	.266
Nurse in-service long-term care training[3]	-.047	.686
Physicians:		
Average number of visits per swing-bed patient	-.061	.609
Reluctance of physicians to admit long-term care patients[3]	-.507	.626
Utilization:		
Swing-bed patient days	-.104	.401
Swing-bed days as a percentage of acute care and swing-bed patient days (in acute care section)	-.256	.036
Long-Term Care Services (Structural Quality Measures):		
Physical therapy[3]	.322	.005
Speech therapy[3]	.167	.153
Occupational therapy[3]	.027	.820
Dental services[3]	.235	.042
Social services[3]	.227	.050
Patient activities[3]	-.051	.664
Structural Quality Index	.262	.023
Project operation:		
Staff attendance at orientation[3]	.219	.060
Inadequate technical assistance[3]	-.032	.787

[1]Correlations are ordinary product-moment correlations, significance is based on the t-test.

[2]In several cases the sample is less than 75 due to incomplete survey responses. Sample size varies from 71 to 75.

[3]This is a dichotomous variable with a value of one indicating the presence of the attribute and a value of zero indicating its absence.

Sources: American Hospital Association (AHA) Hospital Survey, County and City Data Book (CCDB), Medicare Cost Reports, Nursing Time Study, Provider Survey of Hospital Administrators, and the Long-Term Care Survey

level involvement in the swing-bed program. The second involves adding independent variables to the equation developed in step one which represent factors more directly related to or under the control of the hospital's involvement in the swing-bed projects. Finally, step three identifies the most significant factors relating to quality. These are selected from the significant variables identified in steps one and two.

(1) Step One: This phase identifies the community and facility variables which are empirically related to quality but, from a conceptual viewpoint, only indirectly related to quality in terms of influencing the care provided to individual swing-bed patients. Case mix variables were also included in this stage since case mix is not easily controlled in this type of program and, further, it is substantively appropriate to adjust for case mix before assessing the hospital level variables which can influence the quality of care more directly. The community, facility, and case mix variables considered in this step are included in the first three categories in Table V.22 with their correlations with patient quality. Among the community characteristics, population density, per capita income, and percent of the population over 65 are significant and positively related to quality. The only facility structural and staffing characteristics which have a significant positive correlation with the quality of care are hospital size, as measured by the number of acute care beds, and expenses per inpatient day. A facility's experience with geriatric patients, as approximated by Medicare inpatient days as a percentage of total acute care inpatient days, has a significantly negative correlation.[13] Although in Section D.2 a relationship was found between the presence of an attached skilled nursing facility and structural measures of quality (or capacity to provide quality care), there is no relationship between the presence of such an attached facility and the process measure of quality. The patient case mix characteristics are those which were identified in the previous analysis as significant correlates of hospital quality. These include: number of psychosocial problems, level of care, presence of dependent edema problem, age, and the number of nursing-oriented problems.

The regression equation developed in the first step of the correlates analysis is presented in Table V.23. Of all the community, facility,

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[13]It was originally assumed that there would be a positive relationship between geriatric experience and the quality of long-term care. This observed correlation is partly explained by the fact that the Medicare inpatient days ratio is negatively related to facility size (-.408,p=.001). That is, since facility size is positively correlated with quality, it appears that the negative relationship between the Medicare inpatient days ratio and quality may be due only to the negative relationship between the number of beds and the Medicare inpatient days ratio.

TABLE V.23:

Community, Facility, and Case Mix Correlates of Patient Quality in the Experimental Hospitals.

Dependent Variable: Patient Quality Scores

Unit of Analysis: Patient

$R^2 = .474$	Mean of Dependent Variable = 65.4
N = 71	St. Dev. of Dependent Variable = 13.1
F = 13.95 ($p<.001$)	Standard Error = 9.8

Independent Variables	Regression Coefficient	Elasticity	Signif. of t	Corr. w/ Dep. Var.
No. of psycho-social problems	-6.65	-.073	<.001	-.422
No. of acute care hospital beds	.24	.156	<.001	.403
Age	-.36	-.433	.010	-.227
Patient problem - dependent edema[1]	10.84	--	.010	.212
Constant	87.01	--	--	--

[1]This is a dichotomous variable with a value of one indicating the presence of the attribute and a value of zero indicating its absence. The elasticity coefficient for dependent edema is not presented since it is dichotomous.

Sources: Long-Term Care Survey and the Medicare Cost Reports

and case mix variables entered into the regression equation, only the following are significantly related to quality in a multivariate setting: size, as measured by the number of beds, and patient case mix factors, as measured by the number of psychosocial problems, age, and presence of dependent edema. These variables explain 47.4% of the variation in quality (p .001).

In this analysis, facility size is a significant correlate of patient quality and represents the effect of a number of facility characteristics. The number of acute care beds is significantly related to high facility expenditures per patient day (.465, p=.001) and high acute care occupancy rates (.305, p=.009). These relationships suggest that larger hospitals may provide more costly specialized services and highly trained staffs and also make more efficient use of existing resources (as indicated by the higher occupancy rates for such facilities). The significant case mix correlates of quality have a similar interpretation as that presented in the preceding section. Specifically, long-term care patient characteristics, such as the number of psychosocial problems and age, are negatively related to quality, whereas acute care characteristics, such as dependent edema, are positively related to the quality of care in the hospitals.

None of the community variables are significant indicators of quality in the regression analysis in the presence of hospital-level factors which appear to exert a more direct influence on care provided. Other facility characteristics which are related to quality individually, such as expenses per inpatient day and the Medicare inpatient days ratio, did not enter the equation because of high correlations to facility size.

(2) Step Two: In this step variables related more directly to the swing-bed project were analyzed to determine their incremental contribution to an explanation of the variation in quality. The fourth category in Table V.22 lists these variables, which include characteristics of the nursing staff, physicians, utilization, long-term care services, and project operation as they relate to the swing-bed experiments and their correlations with quality.

In order to evaluate the incremental effect on the R^2 of each group of characteristics, each group of variables was added separately to the equation developed in step one. The addition of nursing characteristics to the step one equation resulted in an increase of explanatory power of 4.7% (to 52.1%, significant at the .05 level). The addition of physician characteristics to the step one equation produced an insignificant 1.2% increase in explanatory power. Since the two variables in the utilization analysis, swing-bed patient days and swing-bed patient days as a percentage of acute care days and swing-bed days, are highly intercorrelated, only the measure of swing-bed days was added to the equation in this analysis. The resulting equation explains 48.2% of the variation in quality, a .8% change, which is also insignificant. The addition of the Structural Quality Index

TABLE V.24:

Community, Facility, Case Mix, and Swing-Bed Project Correlates of Patient Quality in the Experimental Hospitals.

Dependent Variable: Patient Quality Scores

Unit of Analysis: Patient

$R^2 = .573$	Mean of Dependent Variable = 65.4
N = 71	St. Dev. of Dependent Variable = 13.1
F = 12.98 ($p<.001$)	Standard Error = 9.0

Independent Variables	Regression Coefficient	Elas-ticity	Signif. of t	Corr.w/ Dep. Var.
No. of psychosocial problems	-6.00	-.066	<.001	-.422
No. of acute care hospital beds	.27	.176	<.001	.403
Age	-.23	-.283	.061	-.227
Patient problem - dependent edema[1]	12.62	--	<.001	.211
Structural Quality Index	2.19	.082	.006	.262
Average nursing time per swing-bed patient day	.05	.107	.045	.197
Constant	62.83	--	--	--

[1]This is a dichotomous variable with a value of one indicating the presence of the attribute and a value of zero indicating its absence. The elasticity coefficient for dependent edema is not presented since it is dichotomous.

Sources: Long-Term Care Survey, Medicare Cost Reports, Nursing Time Study, and the Provider Survey of Hospital Administrators

explains 54.2% of the variation, a significant 6.9% change. The project operation variables added an incremental 1.8% to the explanation of quality, which is not significant. In summary, of the swing-bed project characteristics, only nursing characteristics and the presence of long-term care services have a significant relationship to quality when facility and patient characteristics are controlled.

(3) Step Three: At this stage the stronget correlates of quality in all groups of independent variables were identified. The independent variables were selected from those which were significantly related to quality in the step one and step two equations. The resulting equation is presented in Table V.24. Case mix factors (number of psychosocial problems, age, and presence of dependent edema), facility size (number of hospital acute care beds), the presence of long-term care services (Structural Quality Index) and nursing time (average nursing time per swing-bed patient day) are all significant correlates of hospital patient quality, together explaining 57.3% of the variation in quality.

As discussed in step one, the case mix factors in conjunction with size explain 47% of the variation in hospital quality. In general, case mix attributes considered more prevalent among typical long-term care patients (old age and number of psychosocial problems), are negatively correlated with quality, whereas, medically-oriented problems (dependent edema) are positively correlated with quality. Facility size, an indicator of a greater potential to provide a broad range of services, including possibly long-term care services, is also a positive correlate of quality. The equation developed at this final step increases the explanation of the variation in quality by 9.9%. This is due to the addition of the two swing-bed project characteristics, nursing time spent per swing-bed patient day and the presence of long-term care services, all of which are positively related to patient quality.

4. Summary of Findings

a. Case Mix Findings:

(1) For long-term care patients in both swing-bed hospitals and comparison nursing homes the most frequently occurring categories of admitting diagnoses (primary and secondary) in both types of facilities were neurological diseases, cardiovascular diseases, and musculoskeletal disorders. There were no overall patient diagnostic profile differences between the swing-bed hospitals and the comparison nursing homes in terms of the 16 diagnostic categories used to measure case mix from a medical care perspective.

(2) The most frequently occurring general categories of patient long-term care problems (primary and secondary) in both types of facilities were nursing-oriented problems and psychosocial problems.

There were significant overall profile differences between the hospitals and the nursing homes in terms of the 27 problems used to measure case mix from a long-term care perspective. Three significant proportional differences occurred consistently between the facilities for both primary problems and primary and secondary problems combined: secondary skin condition and pain were more frequent among hospital patients, while neurological immobility was more frequent among nursing home patients.

(3) Swing-bed hospital patients were generally more independent than nursing home patients in terms of functional capabilities, as measured by activities of daily living (ADLs). The relative rankings (in order of functional independence in eight specific ADL categories) were the same for both facility groups, with the greatest number of patients independent in feeding and the fewest independent in bathing. There were, however, no overall differences between the facilities on the ADL Index, a measure of a patient's overall functional ability.

(4) At the skilled level of care, there were no significant overall profile differences between the hospitals and nursing homes in terms of admitting diagnoses and the ADL Index. The overall long-term care problem profiles for skilled level patients were significantly different between the two facility types, as were the three individual problems identified in finding (2) for all patients.

(5) There were significant overall differences between hospital and nursing home patients in terms of additional patient characteristics such as demographic characteristics, sensory impairments, psychosocial status, medical condition, and level and type of care. Hospitals tended to have more short-term, rehabilitative, and male patients, more patients who demonstrated either physical improvement or psychological stability or improvement, and patients with fewer speech and behavior problems. Nursing home patients had significantly more problems overall and significantly more sensory impairments and psychosocial problems. The numbers of nursing and medically-oriented problems were not significantly different between hospital and nursing home patients.

b. <u>Quality of Care Findings</u>:

Quality of care was measured primarily in terms of the adequency of services provided to long-term care patients. It was measured at four levels: for each service provided, for each individual patient problem (a patient could have several problems), for each patient, and, in the aggregate, for each facility. The service and problem level quality scores are most important since they allowed for a more detailed assesement of quality and were based on higher frequencies.

(1) The quality of care provided in swing-bed hospitals was significantly lower than the quality of care provided in the comparison

nursing homes, using the problem level quality scores developed as a part of this evaluation. The average nursing home problem quality score was 68.4% and the average hospital score was 64.0% out of a maximum possible score of 100%. This difference was of borderline significance at the patient level and not significant at the facility level.

(2) The differences in problem-level quality scores between the swing-bed hospitals and the comparison nursing homes remained significant when skilled care patients were analyzed alone. Differences in patient level quality scores, however, disappeared when this control was introduced.

(3) Problem level quality scores varied greatly by problem type. As a group, the psychosocial problems had the lowest quality scores, and further, the hospital quality scores (45.1) were significantly lower than nursing home quality scores (61.5) in this problem area. The hospital problem quality scores were also significantly lower than the nursing home scores in treating the specific problems of primary skin condition; incontinence of urine; depression; and loneliness, isolation and lack of socialization. When skilled level patients were analyzed separately, the differences in psychosocial problem scores remained significant. In terms of specific problems, quality scores were significantly lower for skilled level hospital patients in the areas of depression and loneliness, isolation, and lack of socialization.

(4) Analysis of services by categories indicated that the nursing homes provided significantly better social-recreational, therapeutic-mental health, physical and occupational therapies, professional nursing, and physician services than the hospitals. The hospitals, however, provided significantly better lab and non-professional nursing services. When skilled level patients were considered separately, these differences between facility types remained except swing-bed hospitals provided significantly better physical and occupational therapies to skilled level patients than the nursing homes. The four service categories in which the hospitals provided consistently poorer quality care were further examined to determine the patient problem areas in which the services were deficient. Social-recreational and therapeutic-mental health service scores were significantly lower for psychosocial problems, professional nursing services were lower for nursing-oriented and psychosocial problems, and physician services were lower for both nursing and medically-oriented problems.

(5) In the swing-bed hospitals, skilled level patients received consistently higher quality care than intermediate level patients when measured at the patient, problem and service levels. Specifically, skilled level patients with nursing-oriented problems received significantly higher quality using problem level quality scores. For all types of service categories, skilled level

patients had higher scores than intermediate patients. These scores were significantly higher for physical and occupational therapies, laboratory, professional nursing, and pharmaceutical services.

(6) Physicians visited long-term care patients in swing-bed hospitals significantly more frequently than patients in the comparison nursing homes. For the hospitals, 86% of the long-term care patients were visited weekly or more often, compared with 17% of the nursing home patients. Although physician visits were more frequent in the hospitals, these visits did not contribute as much as in the nursing homes to the quality of care as measured by the provision of specific services for each patient problem.

(7) Written discharge plans were present significantly more often for comparison nursing home patients than swing-bed hospital patients. For the comparison nursing homes, 63% of the medical charts contained written discharge plans, compared with 28% for the swing-bed hospitals. Further, 67% of the hospital patients were expected to be discharged within three months, while only 18% of the nursing home patients were expected to be discharged in this time period.

(8) Six long-term care services were available more frequently in a group of 33 Medicare-certified skilled nursing facilities (in the three experimental states) than in the swing-bed hospitals. The six services studied constitute key long-term care services required under the Medicare conditions of participation which were waived for the experimental hospitals. The percentage of all swing-bed hospitals providing each service (in order of increasing frequency) was: occupational therapy (5%), patient activities (16%), speech therapy (17%), social services (36%), dental services (52%), and physical therapy (53%). The greatest discrepancies between the nursing homes and hospitals were in the availability of patient activities services and social services.

c. Correlates of Quality:

Using the patient-level quality scores discussed above, several analyses were conducted in order to determine the extent to which several factors were related to the quality of care provided in swing-bed hospitals and comparison nursing homes.

(1) Case mix was not as significant a correlate of quality provided in nursing homes as it was for hospitals. In the swing-bed hospitals, case mix explained 43.2% of the variation in the quality of care, whereas it only explained 23.5% of the variation in the quality of care in the nursing homes.

(2) There were significant differences between the hospitals and the comparison nursing homes in terms of the relationships of two

attributes to quality of care measured at the patient level. The number of psychosocial problems was a negative indicator of quality in the hospitals but was not related to quality in the nursing homes. The problem of dependent edema, a medically-oriented problem, was a positive indicator of quality in the hospitals but not in the nursing homes.

(3) Community, facility, and case mix characteristics of the swing-bed hospitals explained 47.4% of the variation in patient-level quality. The addition of characteristics related to the swing-bed experiments significantly increased the explanation of the variation in patient level quality by 9.9%.

(4) Overall, 57.3% of the variation in patient-level quality for swing-bed hospitals was explained by case mix factors (number of psychosocial problems, patient age, and dependent edema problem), facility size, presence of long-term care services, and nursing time. Case mix attributes considered more prevalent among typical long-term care patients (old age and number of psychosocial problems) were negatively associated with patient quality. Dependent edema, a medically-oriented problem, was positively associated with quality. Larger hospitals tended to provide higher quality of care, while nursing time per swing-bed patient day and the presence of long-term care services (i.e., those which are required of skilled nursing facilities, but which were waived for the experimental hospitals) were positive correlates of quality.

E. IMPLICATIONS

The implications presented in this section deal with whether a swing-bed program should be implemented nationwide, what levels of long-term care should be provided under such a program, and what quality assurance steps should be taken on behalf of long-term care patients in swing-bed hospitals.

1. Programatic Implications

(1) The average hospital quality scores at the facility, patient, and problem levels are approximately two to four percentage points lower than the average comparison nursing home quality scores. In considering this difference, two points are important. First, the comparison nursing homes chosen for this study are all Medicare-/Medicaid certified facilities. Although all are located in rural communities in the three experimental states, none are located in communities served by swing-bed hospitals. In fact, many communities served by swing-bed hospitals do not have certified nursing homes available within the community. Thus, residents of swing-bed hospital communities frequently have, at best, only non-certified long-term

care facilities within a reasonable distance of their homes. Since this study was not designed to specifically measure the quality of long-term care conveniently accessible to swing-bed patients, the comparison nursing home sample was not chosen on the basis of accessibility. It is likely that the experimental hospitals would have performed better (relatively speaking) had more accessible comparison facilities been used. Second, the order of magnitude of the quality difference between swing-bed hospitals and the comparison nursing homes, two to four percentage points, is not substantial. Consequently, in view of the relatively stringent comparative standard and the rather small absolute difference between swing-bed hospitals and nursing homes in terms of the quality of care, the general conclusion reached in this analysis is that rural hospitals can provide adequate long-term care if a swing-bed program is implemented nationally.

(2) On the basis of the case mix results, it is anticipated that swing-bed hospitals participating in a national program would tend to admit long-term care patients with stronger medical and short-term needs than the typical nursing home patient. Hospitals will be more inclined to treat long-term care patients with greater rehabilitation potential and, as shown in Chapter IV on utilization, more prone toward a shorter stay in the facility. Nonetheless, since hospitals would also be treating patients with psychosocial and functional problems more typically found in nursing home patients, although fewer in number, such patients should be adequately cared for and appropriate quality assurance steps should be taken (as indicated below).

(3) Although overall quality differences are minimal, the hospital quality scores in the problem category of psychosocial problems are approximately 16.4% lower than those for the comparison nursing homes. Specifically, the problem areas of depression and loneliness, isolation, lack of socialization have significantly lower scores. This finding is supported by the fact that, at the services level, the hospitals also provided significantly poorer social-recreational and therapeutic-mental health services. It serves to highlight the need for adequate social, recreational and emotional support services in the swing-bed hospitals.

(4) The quality of long-term care provided to intermediate level patients in swing-bed hospitals is significantly lower than that provided to skilled level patients. This analysis did not examine differences between swing-bed hospitals and comparison nursing homes in terms of the quality of care provided to intermediate level patients. Hence, the only comparison available in this regard focuses on the quality of care provided to intermediate level patients relative to skilled level patients within the swing-bed hospitals. Again, the order of magnitude in terms of the differences in quality of care provided to the two patient groups is

not substantial (five percentage points at the problem level). Nonetheless, hospitals provided lower quality of care than nursing homes and, in addition, provided lower quality care to intermediate level patients than to skilled level patients, indicating that the care provided to intermediate level patients is approximately eight percentage points below that care provided to skilled level patients in nursing homes. This leads to the conclusion that swing-bed hospitals can provide adequate care to intermediate patients, yet the need for quality assurance is stronger for patients at the intermediate level and greater emphasis should be given to the quality assurance guidelines in this section on behalf of such patients.

(5) The experimental swing-bed hospitals provided long-term care to relatively few personal care patients. Consequently, the results of this study cannot be used to develop implications regarding the appropriateness of providing personal care in swing-bed hospitals. The indications are, however, that since hospitals provide generally poorer quality care to patients requiring more social and psychological support, (often patients with fewer medically-oriented problems), that they are less likely to provide adequate quality care to personal level patients. In addition, the quality assurance steps recommended in this section do not take into consideration all the special needs of personal care patients. But, since such personal care is not reimbursed by either Medicare or Medicaid, it may not be appropriate to attempt to regulate the provision of personal care to private pay patients in the event of national implementation.

(6) Although physician visits were more frequent to swing-bed hospital patients than to nursing home patients, the hospitals have significantly lower quality scores for physician services. This is especially true for swing-bed patients with nursing or medically-oriented problems. Therefore, special consideration should be given to the appropriate provision of physician services for long-term care patients.

(7) The relative paucity of written discharge plans for swing-bed hospital patients in conjunction with a high discharge rate points up a need for quality assurance recommendations in the area of discharge planning.

(8) It may be appropriate to consider using the criteria sets used in this study as the basis for educational or information dissemination programs designed to assure quality for long-term care patients. The criteria sets basically specify the type of services which should be provided in treating each of the 27 long-term care problems. Since the criteria sets were constructed specifically for assessing the quality of care provided to swing-bed patients, and since the results of this study highlight the specific areas where hospitals are deficient relative to these criteria sets, they may be of value in initiating an education program for swing-bed medical and nursing staff.

(9) As a result of the previous implications, it is recommended that a national swing-bed program implement the following quality assurance measures:

(a) Enforce the section of the Medicare/Medicaid condition of participation for skilled nursing facilities on staff development (CFR 405.1121(h)) which states, "An ongoing educational program is planned and conducted for the development and improvement of skills of the facility's personnel, including training related to problems and needs of the aged, ill and disabled." This requirement would assist in orienting swing-bed hospital personnel to the special needs of long-term care patients, an area where hospitals appear to be deficient.

(b) Enforce the Medicare/Medicaid condition of participation for social services (CFR 405.1130(a)-(c)). This requirement is designed to meet the special social and emotional needs of long-term care patients. It requires that these needs be identified and that appropriate services be provided by hospital staff, or by referral to providers outside the hospital.

(c) Enforce the major provisions of the Medicare/Medicaid conditions of participation for patient activities (CFR 405.1131 (a)-(b)). In the provision of patient activity programs, it is recommended that the swing-bed hospitals not be required to provide separate dining and patient activity rooms, although they should be encouraged to do so. This recommendation is intended to promote the physical, social, and mental well-being of the patients without burdening hospitals with additional capital costs which might not be justified on the basis of small long-term care case loads. To the extent that swing-bed hospitals have excess space capacity, they should be encouraged to provide additional space for long-term care patient activities in a flexible manner.

(d) Enforce the Medicare/Medicaid discharge planning standard (CFR 405.1137 (h)). This requirement, which states that a written discharge plan should be present, will help ensure continuity of care for long-term care patients discharged from swing-bed hospitals. Such patients, unlike typical acute care patients, will often need institutional or non-institutional care after discharge from the swing-bed hospital.

(e) Include swing-bed patients under PSRO and Medicaid long-term care review programs which are currently being implemented in many areas. Participation in such programs would serve to ensure against inappropriate patient placement and also serve a continuing education role of potential value

to hospital staff members involved in the provision of long-term care.

(f) In conjunction with the staff development requirement in (a) above, written guidelines and educational materials should be available for all hospitals participating in a swing-bed program. These materials should concentrate on the provision of restorative and social services which are often needed by the long-term care patient. Such materials should be particularly aimed at the roles of physicians and professional nursing personnel, and their appropriate role in the provision of long-term care.

2. Research Implications

(1) The process measures of quality designed for this evaluation should be validated using measures of outcome or change in patient status. They should also be analyzed in relationship to a patient's satisfaction with the quality of the care provided.

(2) The possibility of developing regulatory requirements on the basis of process measures of quality such as those used in this study should be explored.

(3) If a national swing-bed program is implemented, its operation should be monitored in terms of differences in patient characteristics and lengths of stay from those observed in this analysis. Changes in these areas could influence the quality of care provided and possibly signify the need for quality assurance steps other than those presented above.

CHAPTER VI

FINANCE

A. INTRODUCTION

This chapter describes the financial component of the swing-bed evaluation. It is intended to provide information on the financial impact of the experiments on participating hospitals, produce findings of value in structuring a swing-bed care reimbursement system, and estimate future expenditures should the swing-bed concept be implemented on a national basis. Section B provides an overview of the analysis; reimbursement procedures followed under the swing-bed experiments are then explained in Section C. Section D describes the data sources and methods employed in the analysis. Findings are presented in Section E, and Section F includes recommendations for structuring a permanent reimbursement system.

B. OVERVIEW

1. Purpose of the Financial Analysis

The financial analysis investigates four major aspects of the swing-bed experiments. First, the analysis contains a determination of the cost to hospitals of providing swing-bed care. Both incremental and full cost were calculated using standard (cost-finding) methods. In addition, two other methods were developed for the determination of incremental cost: one a mathematical estimation based on the distinction between fixed and variable costs, and the other a regression-based prediction approach.

Second, the financial impact of the swing-bed projects on hospital costs and revenues was examined. Swing-bed costs and revenues were compared to determine if the revenues derived from long-term care were sufficient to cover costs. Since the reimbursement scheme used in the experiments required hospitals to offset acute care costs with long-term care revenues, reimbursement revenue for acute care was affected. An analysis was therefore undertaken to determine the impact of the revenue offset on total hospital reimbursement. This analysis also indicates the possible effects of such a reimbursement system on the major third-party payers.

Third, since swing-bed care represents an alternative to long-term care provided in nursing homes, a comparison of the two alternatives was made. Cost-effectiveness ratios using cost data from the financial analysis and quality scores from the quality component of the evaluation were compared for a sample of swing-bed hospitals and existing skilled nursing facilities.

Finally, the financial analysis considers questions relating to na-

tional implementation of a swing-bed program. Recommendations are based on the findings reported and deal with the key features of a national reimbursement scheme and estimates of future costs.

2. Incremental and Full Cost

Two perspectives are taken here in defining the cost of swing-bed care: incremental cost and full cost. The incremental cost of swing-bed care is defined as the "add-on" cost of providing long-term care in a facility which already exists to provide acute care. The incremental cost of swing-bed care to the dietary department, for example, consists of the cost of additional food, supplies, equipment, and staff needed for long-term care patients. The cost of existing supplies, equipment, and salaries for dietary personnel would, according to the definition, not be considered incremental since these are already required to provide acute care. Incremental cost is used in the experiments as the basis for both routine patient care reimbursement and the experimental incentive payment. This procedure, as discussed below, represents a departure from standard Medicare and Medicaid reimbursement policy, which emphasizes full cost reimbursement for services.

The full cost of swing-bed care is defined as the cost which would be calculated by appropriately allocating all components of hospital cost to long-term care. Again using the dietary department as an example, the full cost of swing-bed care would include not only the cost of additional food, supplies, and personnel for swing-bed patients but also a proportional share of all other dietary department equipment and personnel costs, and a share of hospital overhead costs incurred by other departments, even though these costs would have been incurred had long-term care not been provided. A determination of full cost permits a comparison of the cost (and cost-effectiveness) of providing long-term care in swing beds with the cost in alternative skilled nursing facilities, which are reimbursed on a full cost basis. Moreover, estimates of full cost are used in assessing the different effects of incremental and full cost reimbursement schemes for long-term care.

C. REIMBURSEMENT PRACTICES UNDER THE EXPERIMENTS

Appendix E of this report contains a brief description of standard Medicare procedures for reimbursement of acute and long-term care routine and ancillary care costs. In determining ancillary cost, hospitals participating in the experiments were not required to treat swing-bed patients any differently than Medicare acute care patients and were reimbursed on the basis of actual cost for ancillary care services provided. The unique reimbursement aspects of the swing-bed experiments related to reimbursement for routine patient care services. Three key features characterized the experimental reimbursement system: (1) reimbursement for swing-bed routine care cost on the basis of a per diem payment rather than on the actual cost of care to the facility; (2) the requirement that hospitals offset swing-bed

revenues against allowable routine care costs before reimbursement for acute care was determined; and (3) in Texas, South Dakota, and western Iowa, an incentive payment paid by Medicare to encourage participation in the projects. The Iowa Swing Bed Project did not have the incentive payment feature.

The reimbursement features of the swing-bed experiments are described below. First, the determination of the per diem payments established for the program is described. The next three sections then explain the manner in which acute care cost and reimbursement are affected by the experimental reimbursement system, with an emphasis on Medicare procedures in the experiments. Included here is a discussion of how the incentive payment was calculated. Finally, the section concludes with a discussion of the effect of the swing-bed programs on reimbursement from Medicaid and private payers.

1. Per Diem Payments for Swing-Bed Care

Payment for long-term care provided under the swing-bed experiments came from three sources: Medicare, Medicaid, and private payers (primarily patients and patients' families). There were few instances in which third-party payers other than Medicare and Medicaid reimbursed for long-term care in swing-bed hospitals.

With the exception of care provided in swing-bed hospitals, Medicare reimburses for skilled nursing care (the highest level of long-term care) only if provided in either certified free-standing skilled nursing facilities or distinct parts of hospitals.[1] Both types of facilities are required to use standard Medicare cost-finding procedures to determine the costs of both ancillary and routine care incurred by Medicare patients, and reimbursement to the facility is then based on these costs. For the swing-bed experiments, reimbursement for routine long-term care is not based on costs incurred; rather, it consists of a per diem payment for patient care.

As discussed in Chapter II, Section B.3, the original guideline suggested by the federal government for setting the per diem rates for the swing-bed experiments stated that they should be based on the Medicaid rate for skilled nursing care in each state. In Texas, the statewide average Medicaid reimbursement rate for skilled nursing care was adopted. Separate rates were established for the western Iowa and South Dakota portions of the experiment to reflect the different Medicaid rates in each state. In central Iowa, the per diem rate was set at the average cost per patient day in Medicare-certified skilled nursing facilities.

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[1]As indicated in Chapter I, Section B, Medicare reimburses at acute care rates for "administratively necessary days" of skilled nursing care.

Medicaid participated to some extent in all three projects. In Iowa, this participation was limited to paying coinsurance for dual Medicare/Medicaid beneficiaries. Texas Medicaid reimbursed for skilled nursing care in swing-bed hospitals at the same rate it paid for such care in skilled nursing facilities. In South Dakota, Medicaid reimbursed for skilled level care at the per diem rate adopted for the experiments by Medicare and reimbursed for intermediate care at the same rate it paid for intermediate care provided in nursing homes. Table VI.1 presents the per diem rates paid by both Medicare and Medicaid during the experiments.

Medicaid is the dominant payer nationally for nursing home care, although Medicaid reimbursement procedures vary by state. Table VI.2 summarizes information on state Medicaid reimbursement policy for long-term care in the three project states and indicates where these policies were modified for the swing-bed experiments.

Private pay patients are defined here as those whose sources of payment for services are either commercial third-party insurors or the patients themselves. In Texas, private pay patients were classified as skilled level patients and charged at the corresponding Medicare/Medicaid per diem rate. In South Dakota, private pay patients were generally considered as intermediate level patients and charged at the per diem rate established for Medicaid intermediate care. As mentioned earlier, neither Medicare nor Medicaid reimburse for personal care, although a small number of personal care days were recorded in the swing-bed project in South Dakota. In Iowa, private pay patients were classified at the intermediate level and were charged varying amounts from hospital to hospital, up to a maximum equal to the Medicare skilled level per diem under the swing-bed program.

2. Medicare Acute Care Cost and Reimbursement Under the Swing-Bed Experiments

Under the reimbursement scheme used in the swing-bed experiments, provision of long-term care affected Medicare allowable routine acute care cost and, consequently, routine acute care reimbursement to participating hospitals. Since hospitals participating in the swing-bed experiments were not required to separate routine acute and long-term care cost, total routine care cost includes the cost of both. In mathematical terms,

(VI.1) TOTRCOST = ACCOST + LTCOST

where

TOTRCOST = Total routine care hospital cost as reported in the Medicare Cost Reports (MCR),

ACCOST = Total cost of routine acute care for all acute care patients (includes direct patient care cost and allocated portions of hospital overhead expense);

this is what allowable acute care cost would be if swing-bed care were not provided, and

LTCOST = Total incremental cost for routine long-term care for all swing-bed patients (includes only additional costs of long-term care).

To determine allowable routine acute care cost (MACCOST) upon which Medicare reimbursement for routine acute care is based, the experimen-

TABLE VI.1:

Per Diem Rates Paid by Medicare and Medicaid for Swing-Bed Patients.

Time Period in Effect	Medicare Skilled[1]	Medicaid Skilled	Medicaid Intermediate
South Dakota			
6/1/76-present	$17.00	$17.00	$14.76
Western Iowa			
6/1/76-present	$33.78	Pays only coinsurance for dual beneficiaries.	
Texas			
7/1/76-8/31/76	$20.50		
9/1/76-8/31/77	$23.37		
9/1/77-2/25/79	$24.55	$24.55[2]	
2/26/79-present	$28.68	$28.68	
Central Iowa			
6/1/77-present	$40.00	Pays only coinsurance for dual beneficiaries.	

[1]Medicare only reimburses for skilled level patients.

[2]Medicaid participation began in January 1978.

Source: Administering agencies and Medicaid agencies in the respective states

TABLE VI.2:

Characteristics of Medicaid Participation in the Swing-Bed Experiments.

	Texas	Iowa[1]	South Dakota
Extent of Participation:	Full payment for skilled level patients only.	Payment of coinsurance for skilled level Medicare/Medicaid patients only.	Full payment for skilled and intermediate level patients.
Dates of Participation:	January 1978 to present.	September 1977 to present.	January 1977 to present.
Reimbursement for Routine Long-Term Care in Nursing Homes:	Skilled and intermediate levels-prospective statewide per diem payment for each level set at statewide average cost for all facilities on the basis of data submitted annually by facilities. No retrospective settlement.	Skilled level-payment of actual facility cost calculated using Medicare regulations and procedures. Intermediate level-prospective per diem payment for routine and ancillary care combined set at the lesser of (1) actual facility cost, (2) reasonable charges, or (3) 74th percentile of all facilities statewide, on the basis of data submitted semi-annually by facilities. No retrospective settlement.	Skilled and intermediate levels-prospective per diem payment set at the lesser of actual facility cost or 110% of the statewide average, plus inflation factors, on the basis of data submitted annually by facilities. No retrospective settlement.
Reimbursement for Routine Long-Term Care in Swing-Bed Hospitals:	Skilled level-same per diem payment as nursing homes.	Not applicable-pays only coinsurance for dual beneficiaries.	Skilled level-prospective statewide per diem payment set equal to the Medicare per diem for the experiment. Intermediate level-prospective statewide per diem payment set at the statewide average cost for all facilities providing intermediate level care.
Reimbursement for Ancillary Services in Nursing Homes:	Billed services provided by outside providers under contract are reimbursed to these providers on the basis of reasonable charges. Services provided by nursing homes themselves must be absorbed in the per diem routine care payment (see above).	Included in routine care reimbursement (see above).	Billed separately by provider and reimbursed on the basis of reasonable charges.
Reimbursement for Ancillary Services in Swing-Bed Hospitals:	Billed by hospital as outpatient care and reimbursed on the basis of reasonable charges.	Not applicable-pays only coinsurance for dual beneficiaries.	Same as nursing homes.

[1]Although the central and western Iowa swing-bed experiments are separate programs, Medicaid involvement is identical for both.

Source: Medicaid ataff and intermediaries and Swing-bed project staff in Texas, Iowa, and South Dakota

tal reimbursement procedure required participating hospitals to deduct long-term care revenues from all payers (termed LTCREV) from total routine care cost. Thus,

(VI.2) MACCOST = TOTRCOST - LTCREV.

Substituting (VI.1) into (VI.2) gives

(VI.3) MACCOST = (ACCOST + LTCOST) - LTCREV.

Equation VI.3 indicates that allowable routine acute care cost remains as it would have been in the absence of long-term care (that is, MACCOST equals ACCOST) only if LTCOST and LTCREV are equal. However, results of the evaluation of the Utah swing-bed experiment (Shaughnessy et al. 1978b) and the results in Section E of this chapter indicate that under the experimental reimbursement scheme, LTCREV exceeded LTCOST. In this case, MACCOST is less than ACCOST and allowable routine care costs are also less than they would have been without the provision of long-term care (hence the name "Reducing Acute Care Costs" experiments). The amount by which MACCOST is less than ACCOST is equal to the amount by which LTCREV exceeds LTCOST. Thus,

(VI.4) REDUCTION = LTCREV - LTCOST.

The practice of offsetting revenues against cost, as opposed to calculating the cost of a service via cost finding and cost allocation, is referred to in this document as the "offset method", and is a standard Medicare procedure for certain items. For example, when it is impossible to appropriately calculate the costs of a non-allowable service, such as a vending machine, the revenues from the operation of the machine are treated as an approximation of the costs and are subtracted from total expenses before the allocation of overhead cost to direct cost centers is begun. However, the use of this method in place of cost finding to separate the costs of two allowable services associated with patient care is new to the Medicare program and represents a departure from cost finding as the primary method of determining patient care costs.

From a cost perspective, as opposed to the reimbursement perspective taken here, provision of swing-bed care does not affect routine or ancillary acute care cost unless the increased volume of patient days leads to economies such as quantity discounts on the purchase of supplies. Also, as long as long-term care revenues are equal to or greater than actual incremental long-term care cost, the hospital will cover the cost of swing-bed care even if there is a reduction in Medicare acute care reimbursement.

3. Effect of Providing Swing-Bed Care on Total Medicare Reimbursement

Since the swing-bed experiments entail a revenue offset which leads to reduced Medicare acute care reimbursement, the impact of the project on total Medicare hospital reimbursement revenue is the difference be-

tween the increase in income from Medicare swing-bed patients and the decrease in acute care reimbursement. This net amount is determined jointly by the proportion of acute care utilization attributable to Medicare and the proportion of swing-bed utilization attributable to Medicare.

Taking an extreme example, if a certain hospital has no Medicare swing-bed utilization (but does have swing-bed utilization paid for by other sources) and half of its acute care patient days are Medicare days, then there will be a decrease in total Medicare routine care reimbursement, since there will be no increased Medicare reimbursement for swing-bed care and a decrease in Medicare routine acute care reimbursement. Conversely, where a hospital has no Medicare acute care utilization but does have Medicare swing-bed utilization, Medicare's total reimbursement to the hospital will be increased. Clearly, most hospitals fall somewhere between these two extremes, with the changes in total Medicare routine care reimbursement due to the swing-bed experiment varying in accord with payer mix. This apsect of the swing-bed experiments is discussed further in Section D.2.

4. Medicare Experimental Incentive Formula and Incremental Cost Calculation

All swing-bed experimental programs except central Iowa included an incentive payment from Medicare to encourage swing-bed utilization in project hospitals. Payments were equal to one-half the amount of the reduction of allowable routine acute care cost achieved due to the provision of long-term care.

Equation (VI.4) indicates that the amount of this reduction is equal to the amount by which total swing-bed care revenue exceeds the incremental cost of providing care. Calculation of this difference thus depends upon the development of a procedure for estimating the incremental cost of providing swing-bed care in each hospital. The procedure used in the RACC experiments is referred to as "Method 1" in subsequent parts of this chapter. Hospitals in central Iowa were not required to calculate incremental cost since there was no incentive payment paid in that experiment.

In 1972 and 1973, prior to finalizing reimbursement procedures for the Utah swing-bed experiment, an analysis of hospital cost centers was conducted to identify those where costs might be incurred due to the provision of long-term care. Six potential sources of incremental cost were identified. Four of the six consist of non-labor costs for the following cost centers: (1) dietary (raw food only), (2) laundry and linen, (3) housekeeping, and (4) operation and maintenance of plant. The remaining two are depreciation expense of moveable equipment purchased to provide long-term care and labor (salary) costs of employees added to provide long-term care. These cost centers were also used to calculate incremental cost for the RACC experiments except that dietary expenses were expanded to include all non-labor expenses.

Cost allocation formulas were used to calculate the incremental cost of long-term care in the first four areas. For laundry and linen, housekeeping, and operation and maintenance of plant, the proportion of total non-labor expense due to routine care (acute and long-term care combined) was determined. Laundry and linen expense was allocated to routine care on the basis of the ratio of direct routine care expense to total revenue-producing department expense, while housekeeping and operation and maintenance of plant costs were allocated to routine care on the basis of the ratio of routine square footage to total revenue-producing square footage. Dietary costs were allocated completely to routine care, except where hospitals had special care or distinct-part long-term care units, in which case costs were allocated on the basis of meals served.[2] After the cost of routine care in each area was calculated, cost was allocated to swing-bed care on the basis of the ratio of swing-bed patient days to total patient days (not including special care unit or distinct-part patient days), under the assumption that acute and long-term care patients are equal in their use of services supplied by these four departments.

One of the basic assumptions underlying the experiments was that participating hospitals had excess capacity and could provide long-term care without additional staff or equipment. Nevertheless, hospitals were given the opportunity to include in incremental cost any expenditures for additional staff or equipment needed to provide long-term care. Additional staff expenses were charged in full to swing-bed care and depreciation expenses for additional equipment were charged on the basis of the percentage of use for swing-bed care.[3]

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[2]The procedure described here is the officially adopted experimental incentive calculation method and forms the basis for the Method 1 incremental cost findings. A slightly different allocation scheme was proposed in the western Iowa/South Dakota project. The differences between the procedures were in the allocation of laundry and linen, housekeeping, and operation and maintenance of plant expenses to routine care. In the western Iowa/South Dakota procedure, laundry and linen cost would have been allocated on the basis of the ratio of routine care pounds of laundry to total pounds of laundry, and housekeeping and operation and maintenance of plant expense on the basis of the ratio of routine care square footage to total hospital (as opposed to only revenue-producing) square footage. The overall effect of these differences would have been to produce an estimated incremental cost lower than that derived using the official method.

[3]Only one hospital reported any expenditure in these two areas in the course of the experiments. However, there are disincentives which discourage hospital reporting of these costs. First, any increases in incremental cost decrease the amount of incentive received but do not increase the reimbursement for swing-bed care. Second, costs in these areas can be partially recovered via standard acute care reimbursement procedures if they are reported as acute care costs.

Total incremental cost of long-term care was computed by summing the costs reported in each of the six cost centers. This amount was subtracted from total long-term care revenue (reimbursement) to derive the total reduction in allowable cost, and half of this was returned to the hospitals as the experimental incentive.

The procedure outlined here differs in one important respect from that followed under the original swing-bed experiment in Utah. In Utah, the incentive payment consisted of 50% of the reduction in Medicare acute care reimbursement, rather than 50% of the total reduction in allowable cost, as described above. The underlying rationale for this procedure was that Medicare should pay an incentive only for cost reductions which directly benefited Medicare and not for cost reductions which accrued to other payers and had no effect on Medicare expenditures. Since there was no incentive in the central Iowa project, hospitals were not required to calculate incremental cost and merely offset the long-term care revenues.

5. Medicaid and Private Pay Acute Care Cost and Reimbursement

Medicaid routine acute care reimbursement in all three states followed Medicare procedures by offsetting swing-bed care revenue against allowable acute care cost. Similar to Medicare then, Medicaid routine care reimbursement to participating hospitals was thus potentially increased by the addition of swing-bed care and decreased by the offset of swing-bed care revenue against allowable acute care cost, with the actual effect in any particular hospital a function of the percentage of Medicaid long-term and acute care utilization. Medicaid ancillary acute care reimbursement was not affected by the provision of long-term care.

The greatest amount of private pay swing-bed utilization was paid for by patients themselves. Less than 10 admissions in all three experiments were paid for by non-federal third-party payers. As to whether reductions in acute care cost similar to those experienced by Medicare and Medicaid were passed on to private third-party payers, the results differ by payer. In South Dakota and Iowa, Blue Cross acute care reimbursement was on the basis of allowable cost (computed using the offset of swing-bed care revenue) and reductions in acute care reimbursement were experienced by these payers in participating hospitals. In fact, since these two Blue Cross plans did not reimburse for swing-bed care, there was always a decrease in total reimbursement to the experimental hospitals as a consequence of providing swing-bed care, owing to the fact that the offset of revenues always produced a lowering of allowable cost. Blue Cross of Texas reimbursed for acute care on the basis of negotiated charges rather than cost. Consequently, unless hospitals chose to lower charges to reflect the increased revenue derived from long-term care, Blue Cross payments for acute care in Texas were not reduced.

Acute care private pay patients paying their own expenses and other non-federal third-party payers were in a similar position, since all

paid for care on the basis of charges rather than cost. If charges were not reduced by hospitals as a result of the additional revenue, then these acute care patients did not benefit from the provision of long-term care in the experimental hospitals.

D. METHODS

This section describes the data sources used and the methods employed in the four areas of the financial analysis: (1) cost to hospitals; (2) financial impact on hospitals; (3) cost-effectiveness of swing-bed care; and (4) estimation of costs under national implementation.

1. Data Sources

Medicare Cost Reports (MCRs) were the primary data source used in the financial study. For reimbursement purposes, hospitals are required to allocate overhead expenses to revenue-producing departments and to apportion the resulting full (indirect and direct) costs to Medicare patients. The MCRs are the financial record of this procedure and therefore contain data on utilization, a trial balance of expenses, a stepdown showing the allocation of overhead expenses, statistical data on which allocation is based (such as square footage and charges), and the full cost of each revenue-producing cost center. Also included are a balance sheet and profit and loss statement. Medicare Cost Reports were obtained for all 82 participating swing-bed hospitals for the years 1974 through 1978. A sample copy of the cost report is contained in the Data Forms Supplement.

Hospitals participating in the two RACC experiments were also required to complete a supplemental worksheet to calculate the incentive payment, a copy of which is also included in the Data Forms Supplement. There are two main advantages in using Medicare Cost Reports as a data source. First, since they are audited according to standard accounting principles (including both desk and field audits) by the Medicare intermediaries, there are consistency checks based on previous years' costs which improve the accuracy of the data for an individual hospital. Another advantage is that the standardized forms and procedures specified by Medicare provide generally comparable data across study hospitals.

As discussed in Chapter IV, findings based on cost report data are presented by calendar year, which may differ from a hospital's fiscal year. For study hospitals not on a calendar year fiscal year, data are included in the calendar year covering the largest part of the fiscal year. For hospitals on a July to June fiscal year, data are included in the calendar year covering the January to June portions of the fiscal year.

Medicare Part A claims are submitted by all acute and long-term care providers to the fiscal intermediaries as interim bills. Each claim contains information on the patient necessary for the intermediary to

accept the claim as valid and to pay the charges incurred. Charges for ancillary services used during the time covered by the claim are included, and these data were used in the determination of ancillary cost for Medicare beneficiaries receiving swing-bed care. All Medicare claims forms filed for swing-bed patients during 1977 were included in the analysis.

2. Cost to Hospitals of Swing-Bed Care

The analyses discussed in this section deal with the determination of the cost of swing-bed care under the experiments. Both incremental and full cost of swing-bed care were considered and are treated here in that order. As discussed earlier, the basic economic rationale behind the swing-bed concept is the existence of excess bed capacity and excess capacity in nursing staff resources in many rural hospitals. The experiments were, therefore, premised on the assumption that only certain costs would be incurred in the provision of swing-bed care. These costs are comprised of expenses which vary during some limited time period (such as a year) and are termed variable costs because they are dependent on the level of utilization. They are distinguished from fixed costs in that the latter are expenses for which the facility is responsible regardless of the amount of utilization during the same limited time period. Therefore, the incremental, or add-on, cost of swing-bed care would ideally be calculated by separating fixed and variable costs and then calculating the variable costs incurred in providing swing-bed care. However, from an accounting viewpoint, no clear agreement exists on which are fixed and variable costs with respect to swing-bed care, and it was not possible to audit individual hospital records to determine fixed and variable costs by hospital. Therefore, a number of procedures for calculating incremental cost were developed for this analysis which did not rely on such empirical investigations and which were intended to augment results based upon cost-finding procedures.

a. Incremental Routine Care Cost--Cost-Finding Method 1: Method 1 was used in the two RACC experiments to calculate incentive payments and was also applied to hospitals in central Iowa to develop a comparable measure of incremental cost per day for these facilities. However, hospitals in the central Iowa project did not begin admitting swing-bed patients until 1977 and therefore were not included in any analysis pertaining to 1976. A t-test was used to compare Method 1 incremental cost for 1976 in the western Iowa/South Dakota experiment with incremental cost for Texas facilities. Average incremental cost per day for 1977 and 1978 was compared across the three projects using one-way analysis of variance (ANOVA).

b. Incremental Routine Care Cost--Cost-Finding Method 2: The second method, also a cost-finding method, uses standard accounting and allocation procedures and is an extension of the incentive calculation formula (Method 1). The primary difference between Method 1 and Method 2 is that Method 2 includes a larger number of cost centers. Since it was difficult to establish a priori which costs in

which departments would vary with the provision of swing-bed care, certain simplifying decisions were made.

First, the six Method 1 cost centers were retained for this analysis. Second, four other cost centers were included because they appeared to contain expenses that would increase with additional utilization. They were: medical records, which would need to maintain records for swing-bed patients; administration, where additional tasks associated with the new service could be expected; and social services and nursing services, which would be required to perform additional patient care activities.

In determining which costs within these cost centers were variable, the policy adopted for Method 1 was used. That is, labor costs were considered to be a fixed cost with respect to swing-bed care and only direct non-labor costs from the trial balance in each of the cost centers were included in the calculations. All non-labor expenses in each cost center were used, which assumes that non-labor expenses are almost entirely variable and include few fixed costs.

The assumption that labor cost was in fact fixed was verified by asking hospital administrators in each of the swing-bed hospitals whether they had hired additional staff as a result of participation in the swing-bed experiment. Only one of the 82 administrators surveyed answered affirmatively. This finding, combined with the fact that only one hospital reported such expenses for purposes of the incentive calculation, supports the validity of this assumption.

The assumption was further verified in conversations with Medicare intermediary staff and administrators of participating hospitals, and in visits to four swing-bed facilities to examine hospital records. On the whole, it appears that in small hospitals, such as those participating in the projects, many non-labor expenses are variable. However, there are some exceptions to this. For example, non-labor costs in administration include items such as fire and malpractice insurance which are fixed rather than variable costs. To the extent that non-labor costs in the cost centers used in this part of the analysis include similar fixed costs, both Method 1 and Method 2 incremental cost results overestimate the true incremental cost of swing-bed care.

Table VI.3 indicates the allocation methods used to derive incremental cost in each cost center. For most cost centers it was necessary to employ two allocation procedures: one to separate routine care cost from total hospital cost and a second to separate swing-bed care cost from routine cost. Nursing costs were allocated entirely to routine care and only the second step was required. Allocation procedures were chosen on the basis of availability of data and the ability to accurately reflect how costs in each department were incurred with the provision of long-term care. Following the experimental procedure, additional labor and equipment cost was allocated directly to swing-bed care.

TABLE VI.3:

Cost Centers and Allocation Procedures for Determining Routine Care Incremental Cost--Method 2.

Cost Centers	Allocation Method for Separating Routine Care Cost from Total Cost	Allocation Method for Separating Swing-Bed Care Routine Cost from Total Routine Care Cost
Laundry and linen[1,2]	CC2	DD
Dietary[1,2]	MM	DD
Operation & maintenance of plant[1,2]	SQ	DD
Housekeeping[1,2]	SQ	DD
Routine nursing[1]	--	TT
Administration[1]	CC1	DD
Medical records[1]	CC2	DD
Social services[1]	CC2	DD
Additional labor cost[2]	taken as reported	
Additional equipment cost[2]	taken as reported	

TT = Ratio of swing-bed care nursing time to total nursing time.
DD = Ratio of swing-bed care patient days to total patient days.
MM = Ratio of meals served to routine care patients to total meals served.
SQ = Ratio of routine square footage to hospital revenue-producing square footage.
CC1= Ratio of direct routine care cost (labor and non-labor combined) to total hospital cost (less the cost of administration and general itself).
CC2= Ratio of direct routine care cost (labor and non-labor combined) to total cost of revenue-producing cost centers.

[1]Non-labor costs only.

[2]Cost center was also used in the RACC incentive calculation (Method 1).

Procedures followed for separating routine care cost from total hospital cost in laundry and linen, dietary, operation and maintenance of plant, housekeeping, and additional labor and equipment cost replicate those used in calculating Method 1 incremental cost. The two allocation procedures involving cost (CC1 and CC2) were used for two types of overhead departments. CC1 was used because administration costs were viewed as applicable to all departments of the hospital, including other overhead departments. CC2 was used for overhead departments whose costs were viewed as applying only to revenue-producing (i.e., patient care) departments. For example, the cost of the medical records department is overhead cost with respect to routine nursing care but inapplicable to other overhead departments such as housekeeping.

For allocation of routine care cost in each cost center to swing-bed care, two schemes were used. The ratio of swing-bed patient days to total (swing-bed and acute care) patient days was used where it could be assumed that acute and swing-bed patients were equal consumers of departmental resources, such as meals or cleaning services. Non-labor routine nursing costs were allocated to swing-bed care on the basis of the results of a nursing time study undertaken in a sample of project hospitals and described in Appendix C. Based on the study results, average direct (patient care) nursing time spent per patient day for swing-bed and acute care patients across all hospitals in the sample was 140.5 minutes and 126.0 minutes, respectively. Time spent in indirect patient care (conferences, record keeping, etc.) was assumed to be spent in the same proportion as direct time. Using these figures, the ratio of yearly nursing time spent on swing-bed patients to total yearly nursing time was computed for each hospital, using the following formula:

$$\text{(VI.5)} \quad TT = \frac{LTPD \times 140.5}{(LTPD \times 140.5) + (APD \times 126.0)}$$

where

TT = Ratio of long-term care nursing time to total nursing time,

LTPD = Swing-bed patient days, and

APD = Acute care patient days.

A similar time study, undertaken in 1975 in a sample of hospitals participating in the Utah swing-bed project, resulted in a different distribution of nursing time between the two groups of patients (Shaughnessy et al. 1978b). Those results indicated that average nursing time spent per swing-bed patient day was 128.4 minutes and average nursing time spent per acute care patient day was 219.9 minutes. It is difficult to know which of these results would be characteristic of a permanent national program, since the distribution of nursing time between acute care and swing-bed care patients will be a function of such factors as acute care case mix, levels of long-term care provided, long-term care case mix, the extent of excess capacity in nursing services, and

the availability of non-nursing staff such as physical or recreational therapists who can provide services as substitutes for nursing staff.

Since Method 2 incremental cost varies as a function of nursing time, it was calculated using both the relative times observed in Utah and those observed in the swing-bed experiments evaluated here. For comparative purposes, nursing costs were also allocated to swing-bed care on the basis of the ratio of swing-bed care patient days to total patient days, which assumes that acute and swing-bed care patients would require equal amounts of nursing time. These latter estimates fall between the costs calculated using the two time study results.

Mean differences in Method 2 incremental cost among the projects were tested for statistical significance using a t-test for 1976 results (based on only two experiments) and one-way analysis of variance for 1977 and 1978 results.

c. Incremental Routine Care Cost--Average Variable Cost Method: Because "cost-finding methods" have certain limitations, such as assumptions about which cost centers are effected by the swing-bed experiment and the assumption that all non-labor expenses are variable, two additional methods of calculating incremental cost were developed. The first of these, the "average variable cost" method, also employs the concepts of fixed and variable cost to estimate the incremental cost of swing-bed care.

This method is premised on the assumption that the portion of the fixed cost base of project hospitals applicable to routine care was stable between 1974 and 1978 (after adjusting for inflation). Therefore, the variable routine cost of acute care can be estimated for each study hospital by attributing all the difference in total routine cost between 1974 and 1975 (the two years prior to the experiments) to one of two major factors: inflation, or changes in acute care utilization. If an adjustment is made for inflation (described below), then average variable cost per patient day for 1975 can be calculated as the change in total routine cost between 1974 and 1975 divided by the change in acute care patient days between the two years. Once average variable cost is known (and appropriately adjusted for inflation), it is possible to calculate an expected change in total routine cost for any given change in acute care utilization by multiplying average variable cost by the change in acute care patient days. Since acute care patient days were known for each study hospital for each year, expected total routine cost could be calculated for 1976, 1977, and 1978. Therefore, conceptually at least, any excess of actual total routine cost, over the amount expected due to changes in inflation and acute care utilization, could be attributed to the provision of swing-bed care.

Since the adjustment for inflation is crucial in this method, the cost experience of the comparison hospitals selected for this study was used. As discussed in Chapter IV and Appendix B, these hospitals were chosen from rural communities in the three states on the basis of their

similarity to project hospitals in terms of cost structure and utilization. Inflation rates for 1975 through 1978 were calculated as the mean annual percentage change in routine care cost per acute care patient day in the comparison hospitals. Separate inflation rates were calculated for hospitals matched with project hospitals in South Dakota, Texas, western Iowa, and central Iowa which were then used to inflate routine costs from one year to the next. Appendix F contains a detailed mathematical statement of this method and presents the final algebraic equation used in the calculations.

Results from the incremental cost methods which are presented in Section E are based only on the two cost-finding methods described above. The cost-finding methodology is the one most directly relevant to current reimbursement procedures and for that reason was emphasized in this evaluation. Findings from the average variable cost method of estimating incremental cost were, on the average, substantially higher than either the Method 1 or Method 2 cost-finding results (for 1978, $40 versus $9 and $16). As discussed above, this method was based on a number of assumptions about cost behavior in project hospitals, in particular that the fixed cost base of the hospitals did not change and that average variable cost was constant over the years considered (but that both fixed cost and average variable cost would vary due to inflation). The level of the incremental cost estimates was such that it appears these simplifying assumptions make it too difficult to accurately estimate the actual incremental cost of swing-bed care with this method. Applying this method at the cost center level as described above also yielded higher than expected cost per day results.

d. Incremental Routine Care Cost-Prediction Method: The final method developed to calculate incremental cost utilizes regression analysis to predict what routine acute care cost would have been in the absence of a swing-bed program. Regression equations predicting total routine cost for 1977 and 1978 for the comparison hospitals were developed from cost, utilization and structural (number of beds, presence of a SNF, etc.) data available for these facilities. The equations were then applied (on a hospital-by-hospital basis) to the set of project hospitals actually admitting patients in 1977 and 1978 to obtain predicted routine acute care cost. The difference between predicted cost and actual cost was then attributed to swing-bed care and divided by swing-bed patient days for the year to estimate routine incremental cost per swing-bed patient day. This method does not assume that only variable costs were incurred or that only certain cost centers were affected by the project. To the extent that the comparison hospitals are similar to the project hospitals, and to the extent that the regression equations have high predictive ability, this method would capture all additional costs associated with the experiments. A discussion of the regression-based estimation procedure involving the comparison hospitals is presented as a research implication in Section F.

e. Determinants of Incremental Routine Care Cost: A final set of analyses associated with incremental cost was a regression analysis examining variation in incremental routine care cost per patient day among admitting hospitals. The dependent variable used was estimated incremental cost (Method 1) per swing-bed patient day for 1978. The independent variables used included some suggested by previous work on the determinants of cost (both acute care and long-term care). These variables (both acute care and swing-bed) included hospital structural characteristics, financial and utilization characteristics, socioeconomic characteristics of the county in which the hospital is located, and measures of quality of swing-bed care.

f. Full Routine Cost of Swing-Bed Care: While the emphasis in the experiments and the evaluation was on incremental cost, a measure of full cost was also developed. Full cost of swing-bed care was used in the comparisons of cost and the cost-effectiveness analysis comparing swing-bed care and nursing home care. Since hospitals reported one routine full cost figure which included both acute and swing-bed care costs, it was necessary to develop a scheme for separating swing-bed costs from the total. To do this, the two components of full routine care cost, the direct cost of patient care (primarily nursing salaries) and the portion of hospital overhead expense applicable to patient care, were first separated and a cost-finding procedure to allocate each to swing-bed care was developed.

The direct cost portion was allocated between acute and swing-bed care on the basis of nursing time spent, on the assumption that the use of nursing resources and costs is proportional to the time spent. The two different time-to-time ratios discussed above were applied to total direct routine care nursing expense (labor and nonlabor). As mentioned earlier, one was based on the results of the nursing time study undertaken for this evaluation and the second on the results of the time study done for the Utah experimental evaluation. For comparison purposes, a third ratio, using the proportion of long-term care patient days to total patient days (which assumes equal use of nursing services per patient day) was also applied. The resulting figures provide a range of full cost estimates which reflect different allocations of nursing time between the two groups of patients. In the comparisons of swing-bed hospitals to nursing homes, full cost calculated using the nursing time study results obtained in this evaluation was used.

The overhead portion of routine care full cost was allocated to swing-bed care on the basis of the ratio of swing-bed patient days to total patient days, on the assumption that while swing-bed and acute care patients were not equal consumers of nursing time, they were equal in use of overhead department resources such as dietary, housekeeping, and administration. Direct and overhead swing-bed care costs (calculated as described) were added to yield the full cost of routine swing-bed care. A t-test was used to compare 1976 full cost estimates for hospitals in western Iowa/South Dakota with estimates for Texas hospitals. For 1977 and 1978, full costs were compared among the three projects using one-way analysis of variance.

The procedure described here follows standard Medicare practice used in calculating the full cost of routine acute care, in that a share of hospital overhead cost is allocated to all patients. An alternate procedure would be to calculate full cost using only those overhead costs which have been shown to be applicable to swingbed care patients. Implementation of such a procedure would require a much more detailed reporting of hospital financial data than is now done for reimbursement purposes. Furthermore, if a full cost reimbursement system for swing-bed care were implemented using this concept, it could be argued that certain categories of acute care patients should also not be charged the costs of certain services. For example, costs of services oriented towards geriatric patients should not contribute to reimbursement paid paid for pediatric patients. Such a procedure would require extensive changes in reimbursement policy and is beyond the scope of this evaluation.

g. Full Cost of Ancillary Long-Term Care: Issues of excess capacity and incremental cost in ancillary departments were not addressed by the swing-bed experiments and therefore not stressed in the financial component of the evaluation, which emphasized routine care. However, a calculation of ancillary full cost per swing-bed patient day was undertaken here to provide an estimate of the cost of ancillary care if the swing-bed concept were to be implemented nationally. The method chosen for calculation of the full cost of ancillary care provided to swing-bed patients used the Medicare RCCAC (ratio of charges to charges applied to cost) procedure. Under this method, the cost of providing ancillary services is apportioned to patient groups on the basis of the proportion of charges attributable to that group. Thus, if outpatients generate 25% of total charges for laboratory services, then the cost of laboratory services for outpatients is considered to be 25% of the total cost. Charges are used because charges for different services are considered to reflect the differing amounts of resources consumed, and consequently cost incurred, in providing services.

Because ancillary charges for swing-bed patients were not identified on the Medicare Cost Reports, Medicare claims were used to determine total ancillary charges for swing-bed patients. Since these data were available only from claims for Medicare swing-bed patients in Texas and western Iowa/South Dakota for 1976 and 1977, the results on ancillary cost per swing-bed patient day are applicable only to Medicare patients for those two projects. To arrive at total Medicare ancillary charges, charges from all Medicare claims for each swing-bed hospital were aggregated in four ancillary service areas corresponding to the four service areas for which charges are reported in the Medicare Cost Reports: laboratory, radiology, pharmacy (drugs charged to patients), and "other" (including medical supplies and various rehabilitative services). Claims for each facility were aggregated to correspond to the calendar time periods covered by the MCRs for that facility.

After calculation of total charges for Medicare patients in each facility in each of the four areas for 1976 and 1977, the ratio of Medicare charges to total charges in each area was calculated and this ratio applied to total full cost (including overhead) to derive the cost of Medicare ancillary swing-bed care in each of the four areas. Finally, Medicare costs in all four areas were summed and divided by the number of Medicare swing-bed patient days in each facility to arrive at the total ancillary cost per patient day for Medicare swing-bed patients. A t-test for mean differences was used to determine if the differences between the two projects were statistically significant.

3. Financial Impact on Swing-Bed Hospitals

This analysis consisted of two parts: (1) a comparison of the cost of providing swing-bed care with the revenues generated by the experiment and (2) an examination of the impact of the revenue offset.

a. Comparison of Swing-Bed Care Cost and Revenue: The financial impact of the swing-bed experiments on participating hospitals was first evaluated by determining the percentage of hospital patient care revenue attributable to swing-bed routine care. Patient care revenue was chosen as the most appropriate basis for this comparison to ensure comparability across all study hospitals, since total hospital revenue is more subject to variation. This analysis was restricted to routine care revenue since it was not possible to determine the ancillary care revenue derived from non-Medicare patients.

Total routine swing-bed care revenue was obtained from the supplementary MCR schedules completed for swing-bed hospitals which admitted patients under the RACC experiments. In hospitals in central Iowa, which were not required to keep a record of charges by payer, the per diem amount charged to Medicare patients was also applied to private pay days. The incentive payment, which was paid only in the RACC experiments, was not included in these calculations because it appeared that the incentive would not be part of a national swing-bed program. The percentage of total patient care revenue accounted for by swing-bed routine care was calculated by dividing swing-bed routine care revenue by total patient care revenue and multiplying by 100. These figures were analyzed separately for central Iowa, western Iowa, South Dakota, and Texas, rather than for each project, since the per diem reimbursement amounts varied widely (from $17 to $40) and had an obvious affect on swing-bed care revenue. Mean differences among the three states were tested for statistical significance using one-way analysis of variance.

Second, the cost and revenue per patient day attributable to swing-bed care were also compared to determine whether revenue generated by swing-

bed care was sufficient to cover the costs of care. For this analysis, average cost per patient day (both incremental and full cost) was subtracted from average revenue per swing-bed patient day, which was obtained by dividing total swing-bed care revenue by total swing-bed patient days. The average difference between the two amounts (excess or loss) was compared across the three states, also using one-way analysis of variance.

b. Impact of the Revenue Offset: It is to be emphasized that this section deals only with routine care costs and reimbursement. As discussed in Section C above, acute care reimbursement revenues from cost-based reimbursers were reduced because participating hospitals were required to offset swing-bed revenues against total routine cost. However, as long as the per diem reimbursement rate was greater than the incremental cost per day of swing-bed care, a hospital could not fail to cover costs incurred even with the reduction in acute care reimbursement. In fact, if all acute care reimbursers were cost-based payers, total reimbursement revenues from the provision of acute and swing-bed routine care would just equal the sum of allowable acute care cost and incremental long-term care cost. In mathematical terms (and using the notation introduced earlier), total revenue from both acute and swing-bed routine care is equal to

(VI.6) TOTREVR = MACCOST + LTREV

where

TOTREVR = Total reimbursement revenues for routine care,

MACCOST = Allowable routine acute care cost (which equals reimbursement for routine care under the assumption that all payers are cost based), and

LTREV = Long-term care revenues from all payers.

Substituting equation (VI.3) (presented earlier),

MACCOST = (ACCOST + LTCOST) - LTREV,

into equation VI.6 yields

(VI.7) TOTREVR = ACCOST + LTCOST.

Thus, when all payers are cost-based, acute care reimbursement payments and per diem payments for swing-bed care equal the cost of providing acute and swing-bed care. It is only in the situation where acute care charges to charge-based payers or to patients themselves are not reduced that a hospital can receive revenues in excess of cost for the provision of swing-bed care.

It is possible, however, that the offset of swing-bed revenue could reduce acute care reimbursement from a particular third-party payer

in an amount which is greater than the reimbursement for swing-bed care from that payer. Should this be the case, the payer would not be covering the incremental cost of providing care to its swing-bed patients. The impact on a particular payer would be a function of the percentages of acute care and swing-bed care utilization attributable to the payer. This is demonstrated mathematically below.

The net payment for swing-bed care for a given payer is equal to the payer's reimbursement expenditure for swing-bed care less the reduction in acute care cost experienced by the payer. A comparison of this amount with the total incremental cost indicates the extent to which the payer is paying more or less than incremental cost. The following equation is based on the simplifying assumption that all payers pay at the same per diem reimbursement rate and that only one level of long-term care is provided.

(VI.8) $TOTSBR_p = LTPCT_p \times LTREV_t$

where

$TOTSBR_p$ = Total swing-bed reimbursement from a given payer,

$LTPCT_p$ = Percentage of swing-bed days attributable to payer, and

$LTREV_t$ = Long-term care revenues from all payers.

The reduction in routine care reimbursement for the payer (i.e., the difference between what acute care reimbursement would be were no swing-bed care provided in the hospital and what it actually is with the offset taken into consideration) can be expressed as,

(VI.9) $ACCRED = ACPCT_p \times (LTREIMB - INCOST) \times LTPD_t$

where

ACCRED = Reduction in routine care reimbursement for the payer due to the offset of long-term care revenues,

$ACPCT_p$ = Percentage of acute care patient days for the payer,

LTREIMB = Swing-bed per diem reimbursement (assumed constant for all payers),

INCOST = Actual routine incremental cost per swing-bed patient day (assumed constant for all payers), and

$LTPD_t$ = swing-bed patient days for all payers.

Again, this equation assumes one level of care and a uniform per diem reimbursement rate and is based on equation (VI.4) in Section C, which expresses the allowable cost reduction achieved through the offset of

swing-bed care revenue. It is a generalized statement of acute care reimbursement and does not reflect the 8-1/2% nursing differential for Medicare or the fact that in some states Medicaid reimburses for acute care on a prospective basis. In the first situation, this formula will understate the amount of Medicare reimbursement. In the second, it may overstate or understate the amount of Medicaid reimbursement depending on the manner in which the prospective rate is set. For the three experimental states which use Medicare cost-finding procedures, equation (VI.9) basically represents the reduction in Medicaid routine care reimbursement (assuming the appropriate variables pertain to Medicaid).

As stated above, the net amount a payer will pay is equal to total swing-bed reimbursement from the payer less the reduction in acute care reimbursement. (The amount in equation (VI.8) less the amount in equation (VI.9)), or

(VI.10) $(LTPCT_p \times LTREV_t) - (ACPCT_p \times (LTREIMB - INCOST) \times LTPD_t)$

Since the total incremental cost for a given payer can be written,

(VI.11) $TOTINC = LTPD_t \times LTPCT_p \times INCOST$,

equating (VI.10) and (VI.11) states the circumstances under which net payment will equal total incremental cost for a given payer, i.e.:

(VI.12) $(LTPCT_p \times LTREV) - (ACPCT_p \times (LTREIMB - INCOST) \times LTPD_t)$
$= LTPD_t \times LTPCT_p \times INCOST$.

Rearranging terms and cancelling where appropriate, equation (VI.12) reduces to

(VI.13) $LTPCT_p = ACPCT_p$.

Thus, it is clear that for third-party payers whose percentage of total swing-bed and acute care patient days are equal, the difference between the payer's total additional reimbursement to the hospital for swing-bed care and reduction in acute care reimbursement will exactly equal the incremental cost of swing-bed care. Third-party payers whose percentage of total swing-bed patient days is greater than the percentage of acute care patient days, will pay greater amounts than incremental cost. The reverse is also true.

Two analyses were undertaken to examine the operation of the revenue offset provision described here. First, the actual net payment by Medicare per swing-bed day of care provided to Medicare beneficiaries in 1977 in the experimental states was calculated using equation (VI.10). Western and central Iowa were treated separately because the per diem reimbursement rates differed by project. The net payments were compared with total incremental cost (Method 1) for Medicare patients to determine the extent to which Medicare net payments covered incremental cost.

Second, for participating hospitals in South Dakota, the impact of the swing-bed program on net Medicaid reimbursement was examined. South Dakota was the only state where Medicaid participated in the experiment to any extent, paying for approximately 3.3% of swing-bed days in 1977. Since Medicaid reimbursed for both skilled and intermediate level care, two separate per diem rates were in effect in 1977--$17 a day for skilled level care and $14 a day for intermediate level care. An average of the two rates ($15.88) was used in the calculation, using equation (VI.10) above. The net payment by Medicaid was then compared to the total incremental cost (Method 1) for Medicaid swing-bed patients. Both of these analyses were carried out summing the reduction in allowable cost experienced by each payer across all hospitals providing swing-bed care and subtracting the total expenditures by the payer for swing-bed care. Hence, the results indicate the extent to which the two government programs underwrote the cost of providing swing-bed care for private payers or were themselves underwritten by others. The results of this analysis would not be representative of a national program to the extent that the percentages of acute and swing-bed utilization attributable to these two payers would vary from those experienced under the experiments.

4. Cost-Effectiveness of Swing-Bed Care

As stated earlier, the evaluation of the projects included a comparison of swing-bed care with an alternative means of providing institutional long-term care. For purposes of this analysis, swing-bed hospitals were compared with Medicare-certified, free-standing skilled nursing facilities (SNFs) located in the three states in terms of: (1) cost per long-term care patient day and (2) cost-effectiveness ratios based on cost and quality.

Two groups of SNFs were used in these comparisons. When all swing-bed hospitals were compared with SNFs in terms of cost alone, the comparison group included 46 Medicare-certified facilities on which data could be obtained, including facilities in both urban and rural locations. For the cost-effectiveness comparison, the comparison group of SNFs were those which had been included in the quality component of the swing-bed evaluation and for which financial data were also available. This group consisted of 12 of the 15 comparison nursing homes. The swing-bed hospitals included in the cost-effectiveness part of the analysis were the 30 facilities for which quality scores were constructed.

a. Comparison of Cost Per Long-Term Care Patient Day: Routine care full cost per patient day was computed for the 46 comparison SNFs, based upon Medicare Cost Report data for 1977, the most recent year for which complete data were available. Since many SNF patients receive ancillary services outside the facilities in which they are residents, such as hospitals or physicians' offices, it was not possible to obtain ancillary service costs for such patients from the cost reports. Therefore, the analysis was restricted to routine care costs.

The comparison group consisted of two types of facilities: (1) those having only a section or part (distinct-part) of the facility certified to provide care for Medicare patients and (2) those completely certified by Medicare to provide such care. For the first type of facility, only costs and patient days for the distinct part were used. For the other facilities, routine care cost per patient day was computed by dividing total facility full routine care cost by total long-term care patient days.

Cost per patient day calculated in this manner for SNFs represented the cost per day for only skilled level patients and was based, therefore, on a more service-intensive and costly group of patients than were encountered in some swing-bed hospitals, where costs were based on both skilled and intermediate level patients. Thus, SNF full cost per day as presented here is slightly higher than the costs for facilities which have both skilled and intermediate level patients.[4]

SNF cost per patient day was compared to both Method 1 and Method 2 incremental cost and full routine care cost in swing-bed hospitals using a t-test for each comparison to determine if the observed differences in cost were statistically significant.

b. Cost-Effectiveness Ratios: In the second part of this analysis, cost-effectiveness ratios for 30 hospitals and 12 comparison nursing homes were calculated by dividing a score measuring quality of routine care by routine care cost per long-term care patient day. This, in effect, indicates the amount of quality provided per dollar of cost incurred. The quality scores used here are an adjusted version of the facility (patient) quality scores whose derivation is described in Chapter V, Section C. The original scores were calculated as the ratio of points received for services provided over total points possible for the full range of facility services including routine care and ancillary care services.

However, as discussed above, only routine care costs were available for the comparison nursing homes, and thus, a measure of quality pertaining to only routine care was appropriate for the cost-effectiveness analysis. Therefore, the original scores were recalculated with ancillary services eliminated. These included: (1) dietary services, (2) pharmacy services, (3) laboratory services, and (4) services performed by non-nursing staff such as physical therapists, physicians, social workers, psychiatrists, and clergy. The resulting scores, which can range from 0 to 100, measure quality of care provided as

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[4]Data presented in the National Nursing Home Survey: 1977 Summary for the United States (National Center for Health Statistics 1979) indicates that in 1976 the total cost per patient day (routine cost alone was not available) was approximately 8% higher in facilities providing only skilled nursing care than in facilities providing both skilled and intermediate level care.

the ratio of points received for routine care services over total points possible for routine care services.

For hospitals, three cost-effectiveness ratios were calculated, each using one of the three cost variables in the denominator (Method 1 and Method 2 incremental cost and full cost) and routine care facility (patient) quality score in the numerator. Since the most recent data available for the nursing homes were for 1977, the cost-effectiveness analysis was based on that year. However, some central Iowa facilities visited as part of the quality study in 1978 did not provide swing-bed care in 1977. For these facilities, incremental and full cost figures in 1978 were deflated to approximate 1977 costs. The deflation factor used was the mean percentage change in each cost variable between 1977 and 1978 for five central Iowa hospitals which provided care in both years. For nursing homes, only one cost-effectiveness ratio was calculated using full cost per routine long-term care patient day in the denominator.

Differences among the three projects in mean cost-effectiveness ratios were tested for statistical significance by using analysis of variance. Also, differences between each of the three hospital cost-effectiveness ratios and the one nursing home measure were tested using a t-test.

5. Estimation of Costs Under National Implementation

Cost projections for a national swing-bed program were based on the estimates of projected utilization presented in Section D.3 of Chapter IV and on costs incurred in hospitals participating in the experiments. Two estimates of swing-bed utilization were calculated, representing a minimum and maximum number of days which would have been provided under a national program in 1978. Both estimates are based on the assumption that only hospitals in rural (non-SMSA) areas would participate in an national program. Multiplying each estimate (minimum and maximum) by an estimate of cost per day resulted in a lower and upper bound within which the cost of a nationwide program would be expected to fall.

The cost per day figures used in this analysis were the costs incurred by participating hospitals in the experimental states in 1978. While these costs are the best available approximations of cost per day in a national program, they have certain limitations due to the nature of the swing-bed experiments. First, as discussed previously, the set of hospitals participating in the experiments were, on the average, smaller and had lower occupancy rates than hospitals in rural areas nationwide. Second, the cost figures are based on a set of input prices prevailing in 1978 in only three states. Therefore, to the extent that cost per day varies as a function of facility and community characteristics, including local price levels, the cost estimates used here may not precisely reflect a national cost per day estimate.

For routine care costs, the two estimates of swing-bed patient days

were multiplied by average Method 1 incremental cost per swing-bed patient day across all admitting swing-bed hospitals in the experiments in 1978. The choice of incremental cost involved two assumptions: (1) the swing-bed reimbursement procedure recommended in this report would be implemented, including the use of both a per diem payment for swing-bed care and the offset of swing-bed care revenue against total routine care cost; and (2) all acute care payers would reimburse on a cost-related basis, as do Medicare, Medicaid, and some Blue Cross plans. As discussed earlier in this chapter, these two assumptions presume that the cost per day to both hospitals and payers should be equal to the incremental cost per swing-bed patient day. If all acute care payers do not reimburse on a cost-related basis, incremental cost would still represent the cost of swing-bed care to hospitals but the cost to third-party payers who are not on a cost-related reimbursement system will be greater than incremental cost.

Estimates of ancillary cost were determined by multiplying the minimum and maximum projected number of swing-bed patient days by the average ancillary cost per Medicare swing-bed patient day across all experiments in 1977. This procedure makes the assumption that all payers reimburse for swing-bed ancillary care on a cost-related basis. Also, no adjustments in ancillary cost per day were made to take into account geographic or demographic variations across the nation. Total nationwide implementation cost was derived by adding projected routine and ancillary costs.

Findings of this evaluation indicate that swing-bed utilization in the project states represented unmet demand for long-term care rather than demand diverted from currently existing facilities. Hence, all the projected costs are assumed to be in addition to current national expenditures for long-term care. While there will also be additional administrative cost to third-party payers, no attempt was made to estimate that cost here since administrative cost is relatively small compared to patient care cost.

E. FINDINGS

1. Cost to Hospitals of Swing-Bed Care

Tables VI.4 to VI.9 present the findings on the cost to hospitals of providing swing-bed care. The first table presents incremental routine care cost per swing-bed patient day using the methodology employed by hospitals in the RACC experiments to calculate incentive payments (Method 1). As indicated, incremetal cost was higher for hospitals in Texas than in western Iowa/South Dakota for all three years. In 1977 and 1978, average incremental cost for hospitals in central Iowa was below the Texas average but higher than in western Iowa/South Dakota. The difference in incremental cost among the three projects was statistically significant for both years, using analysis of variance. Incremental cost averaged across the three projects increased by 5.9% between 1976 and 1977 and by 8.6% between 1977 and 1978.

TABLE VI.4:

Incremental Routine Care Cost Per Swing-Bed Patient Day for Admitting Hospitals by Project and Year--Method 1

	Texas	Western Iowa/ South Dakota	Central Iowa[1]	Total
1976				
Mean (p=.011)[1]	\$8.51	\$6.15		\$7.72
St. Dev.	1.38	.85		1.66
Minimum	7.13	5.14		5.14
Maximum	11.20	7.16		11.20
No. of Hospitals	8	4		12
1977				
Mean (p=.002)[2]	\$9.66	\$6.89	\$8.62	\$8.37
St. Dev.	2.84	1.66	2.69	2.66
Minimum	5.99	4.60	4.60	4.60
Maximum	15.02	9.99	16.41	16.41
No. of Hospitals	19	20	21	60
1978				
Mean (p=.003)[3]	\$10.53	\$6.88	\$9.39	\$8.91
St. Dev.	3.76	1.81	2.86	3.17
Minimum	6.81	3.74	4.96	3.79
Maximum	22.08	9.59	17.70	22.08
No. of Hospitals	14	16	21	51

[1]Hospitals in the central Iowa experiment did not begin admitting swing-bed patients until June 1977. Participating hospitals in that project were not required to calculate incremental cost as part of the experiment. The values presented here were calculated for comparative purposes.

[2]Value is the exact p-value, or significance level, associated with the two-sample t-test for mean differences.

[3]Value is the exact p-value, or significance level, associated with the F-test for one-way analysis of variance.

Source: Medicare Cost Reports

TABLE VI.5:

Incremental Routine Care Cost Per Swing-Bed Patient Day for Admitting Hospitals by Project and Year--Method 2.

	Texas	Western Iowa/ South Dakota	Central Iowa[1]	Total
1976				
Mean ($p=.069$)[3]	$12.75	$9.96	--	$11.74
St. Dev.	2.37	1.65	--	2.48
Minimum	10.18	8.05	--	8.05
Maximum	15.26	11.39	--	15.26
No. of Hospitals[2]	7	4	--	11
1977				
Mean ($p<.001$)[4]	$15.30	$11.72	$17.31	$14.79
St. Dev.	4.21	2.42	5.43	4.80
Minimum	9.91	7.42	10.79	7.42
Maximum	26.29	15.44	31.13	31.13
No. of Hospitals	17	20	21	58
1978				
Mean ($p=.010$)[4]	$16.80	$12.39	$17.28	$15.62
St. Dev.	5.17	3.74	5.45	5.28
Minimum	12.18	5.82	10.77	5.82
Maximum	32.50	20.40	31.08	32.50
No. of Hospitals	14	16	21	51

[1]Hospitals in the central Iowa experiment did not begin admitting swing-bed patients until June 1977. Participating hospitals in that project were not required to calculate incremental cost as part of the experiment. The values presented here were calculated for comparative purposes.

[2]Cost reports for one Texas hospital in 1976 and two Texas hospitals in 1977 were missing certain items needed for these calculations and the hospitals were, therefore, excluded from the analysis in these years.

[3]Value is the exact p-value, or significance level, associated with the two-sample t-test for mean differences.

[4]Value is the exact p-value, or significance level, associated with the F-test for one-way analysis of variance.

Source: Medicare Cost Reports

TABLE VI.6:

Full Routine Care Cost Per Swing-Bed Patient Day for Admitting Hospitals by Project and Year.[1]

	Texas	Western Iowa/ South Dakota	Central Iowa[2]	Total
1976				
Mean (p=.100)[3]	$63.58	$50.05	--	$59.07
St. Dev.	13.71	7.02	--	13.32
Minimum	46.16	44.68	--	44.68
Maximum	88.31	70.09	--	88.51
No. of Hospitals	8	4	--	12
1977				
Mean (p=.006)[4]	$72.74	$58.57	$74.77	$66.53
St. Dev.	16.22	13.09	4.94	15.58
Minimum	54.23	32.45	68.31	54.23
Maximum	128.76	88.20	81.57	128.76
No. of Hospitals	19	20	5	44
1978				
Mean (p=.001)[4]	$78.05	$62.82	$83.69	$75.60
St. Dev.	15.12	16.25	14.72	17.52
Minimum	52.79	29.91	61.13	29.91
Maximum	117.99	88.20	114.18	117.99
No. of Hospitals	4	16	21	51

[1]The routine nursing cost component included in full cost was allocated in accordance with the results of a nursing time study conducted in a sample of participating swing-bed hospitals.

[2]Hospitals in the central Iowa experiment did not begin admitting swing-bed patients until June 1977.

[3]Value is the exact p-value, or significance level, associated with the two sample t-test for mean differences.

[4]Value is the exact p-value, or significance level, associated with the F-test for one-way analysis of variance.

Source: Medicare Cost Reports

The results on incremental routine care cost per swing-bed patient day calculated using Method 2, which included the non-labor costs of four additional cost centers not included in Method 1, are presented in Table VI.5. Similar to the Method 1 results, incremental cost was lowest for hospitals in the western Iowa/South Dakota project. Central Iowa and Texas facilities, however, had much closer results for this estimate of incremental cost than for Method 1 cost, with Texas hospitals slightly higher (less than $.50) in 1977 and 1978. Between 1976 and 1977 incremental cost per swing-bed day increased by 15.3%, and by 15.1% between 1977 and 1978. An analysis of variance indicates that the difference among the three projects for this measure of incremental cost is statistically significant.

Table VI.6 presents full routine care cost per swing-bed patient day. While full cost is by definition higher than incremental cost, the relationships among full cost estimates in the different projects and across the three years is similar to that reported for Method 2 incremental cost. For all three years, Texas hospitals had higher full cost estimates than hospitals in western Iowa/South Dakota. However, for 1977 and 1978, hospitals in the central Iowa project had higher cost than those in either Texas or western Iowa/South Dakota. As with both types of incremental cost, the differences in full routine care cost per day among the three projects is statistically significant. Full cost averaged across the three projects increased by 12.6% between 1976 and 1977 and by 13.6% between 1977 and 1978. When the full cost estimates of swing-bed care are subtracted from reported full routine cost (which is inclusive of acute care and swing-bed care costs), the resulting figures are estimates of the full cost of acute care in project hospitals. Across all admitting hospitals in 1976 full cost per acute care day was $28.35, in 1977, $62.69 and in 1978, $70.85. As indicated, nursing time was allocated to swing-bed care according to the results of a time study which indicated that more nursing time (per patient day) was spent on swing-bed patients than on acute care patients. Hence, the full cost per day of swing-bed care is greater than the full cost per day of acute care.

The Method 2 incremental cost and full cost estimates presented in Tables VI.5 and VI.6 include routine care nursing cost components which were allocated to swing-bed care according to the nursing time study undertaken in a sample of project hospitals. As mentioned, this study indicated that 140.6 minutes of direct nursing time were provided per swing-bed patient day and 126.0 minutes were provided per acute care patient day. Table VI.7 presents a comparison of average Method 2 incremental costs and full costs using three different assumptions about the allocation of routine care nursing time to acute and swing-bed patients. The first estimates, based upon the nursing time study, are repeated from Tables VI.5 and VI.6. The second estimate was calculated assuming that swing-bed and acute care patients are equal users of nursing time and hence, cost was allocated on the basis of the ratio of swing-bed patient days to total patient days. Finally, for comparison purposes, cost estimates for the swing-bed projects evalua-

ted here were computed using the results of the Utah time study mentioned in Section D. That study indicated that more direct nursing time (219.9 minutes) was spent with acute care patients than swing-bed patients (128.4 minutes). Since it is difficult to know which of these different situations would exist in a more widespread program, all three results are presented here for comparative purposes. The table indicates that there was relatively little change in the incremental cost estimates when the three different time allocation schemes are compared. Full cost estimates varied more widely, with a difference of almost $20 per day between the cost estimate based on the Utah time study and that based on the nursing time study conducted as part of this section.

TABLE VI.7:

Swing-Bed Care Cost per Day Using Different Nursing Time Allocation Factors in Method 2 Incremental and Full Routine Care Cost Per Day.

	1976	1977	1978
Method 2 Incremental Cost			
Nursing Time Study	$11.74	$14.79	$15.62
Ratio of Swing-Bed Patient Days to Total Patient Days	$11.68	$14.63	$15.43
Utah Time Study	$11.49	$13.99	$14.73
Full Cost			
Nursing Time Study	$59.07	$66.53	$75.60
Ratio of Swing-Bed Patient Days to Total Patient Days	$56.30	$64.40	$72.09
Utah Time Study	$46.01	$52.46	$58.76

Source: Medicare Cost Reports

Findings on full cost of ancillary swing-bed care are included in Table VI.8 and apply to Medicare patients only. As stated in Section D, these analyses do not include central Iowa and pertain only to 1976 and 1977. Average ancillary care full cost in 1976 was $6.33 per patient day and $9.97 per patient day in 1977. Variation in ancillary cost was greater than the variation in incremental or full routine care cost, with values ranging from zero to $36.87 per patient day. The amount of

TABLE VI.8:

Ancillary Full Cost per Swing-Bed Patient Day by Project and Year for Medicare Patients in Admitting Hospitals Only.

Ancillary Full Cost per Swing-Bed Patient Day	Western Iowa/ South Dakota	Texas	Total
1976			
Mean (p=.453)[1]	$7.48	$5.68	$6.33
St. Dev.	2.51	4.12	3.59
Minimum	5.74	.67	.67
Maximum	11.21	11.60	11.60
No. of Hospitals	4	7	11
1977			
Mean (p=.706)[1]	$9.55	$10.46	$9.97
St. Dev.	7.79	5.48	6.75
Minimum	.08	.00	.00
Maximum	36.86	18.78	36.86
No. of Hospitals	18	15	33

[1]Value in parentheses is the exact p-value, or significance level, associated with the two sample t-test for mean differences.

Source: Medicare Cost Reports

TABLE VI.9:

Regression Equation for Incremental Routine Care Cost per Swing-Bed Patient Day in 1978.

Dependent Variable: Incremental Routine Cost for 1978 - Method 1

Unit of Analysis: Admitting Hospital

R^2	= .54	Mean of Dependent Variable	= 8.91
N	= 50	St. Dev. of Dependent Variable	= 3.29
F	= 8.32 ($p<.001$)	Standard Error	= 2.39

Independent Variables	Regression Coefficient	Elasticity	Signif. of t	Corr. w/ Dep. Var.
Number of swing-bed patient days in 1978	-.001	-.090	.050	-.414
Acute care occupancy rate	-9.21	-.414	.015	-.134
Presence of an attached nursing home in 1978[1]	-2.14	--	.024	-.390
Participaton in the western Iowa/South Dakota project[1]	-2.38	--	.006	-.481
Number of registered nurses per inpatient day in 1977	2.23	.148	.199	.144
Number of LPNs per inpatient day in 1977	2.89	.099	.061	.394
Constant	12.50	--	--	--

[1]The elasticity for this variable is not given since it is a dichotomous variable.

Source: Medicare Cost Reports and American Hospital Association (AHA) Hospital Survey

variation is due partly to the fact that average ancillary cost in hospitals with low utilization is more susceptible to variation in individual patient characteristics than is average routine cost. The hospital which averaged $36.86 is an example of this phenomenon, since the average is based on only one patient in 1977. There are no significant differences in ancillary care cost per long-term care patient day between the two projects for either study year.

Table VI.9 presents the results of a regression analysis with incremental cost per swing-bed patient day in 1978 as the dependent variable. As indicated, 54% of the variation in incremental cost is explained by the independent variables in the equation. With the exception of number of registered nurses per patient day in 1977, all regression coefficients are significant at less than the .10 level using two-tailed tests. The amount of swing-bed care provided is negatively related to incremental cost, indicating that there may be some economies associated with the provision of swing-bed care. However, the magnitude of the regression coefficient indicates that the reduction in cost associated with increasing utilization is very slight; incremental cost per day is decreased by less that one cent for each additional day of swing-bed care provided.

Incremental cost per day is also significantly and negatively related to the acute care occupancy rate of the hospital, with an increase of one percentage point in acute care occupancy resulting in a decrease in cost per day of approximately 9.2 cents. Also, the elasticity of incremental cost with respect to occupancy is larger in absolute magnitude than for any other variable. As indicated in Chapter IV, acute care occupancy is itself negatively associated with the number of swing-bed days of care provided. The presence of a stronger negative relationship between incremental cost per day and occupancy, controlling for the number of days of care provided, indicates that the potential economies discussed in the preceding paragraph may be less important than a broader effect resulting from a higher volume of acute care patient days. That is, higher acute care occupancy very likely results in a more efficient use of overall hospital resources with resulting carryover to the provision of swing-bed care.

In 1978, 28% of the hospitals admitting swing-bed patients reported having an attached nursing home. These hospitals had a significantly lower swing-bed cost per day than hospitals without attached long-term care facilities. Medicare cost-finding procedures require hospitals to allocate the cost of overhead departments such as housekeeping and operation and maintenance of plant to the nursing home on the basis of the ratio of nursing home square footage to total facility square footage. To the extent that this allocation method overstates the amount of costs that are actually incurred in the operation of the nursing home, the amount of overhead cost allocated to the hospital will be understated, resulting in an artificially low cost base for

calculation of the incremental cost of swing-bed care.[5]

Finally, in terms of factors associated with lower cost per day, hospitals participating in the western Iowa/South Dakota experiments had, on the average, an incremental cost $2.38 lower than hospitals in the other projects, taking the other independent variables into account. A separate regression equation was computed using the same set of independent variables but replacing the "project" variable with one indicating South Dakota to determine if state-level rather than project-level factors account for this relationship. The coefficient on the state variable, though negative, was not significant ($p=.145$) indicating that the effect is at least partly attributable to the project, rather than state, characteristics.

The remaining independent variables in the regression equation are RNs and LPNs per inpatient day, both of which are positively related to incremental cost per swing-bed day. However, the regression coefficient for the number of registered nurses is not significant. Since Method 1 incremental cost does not include labor costs, which would be expected to be positively related to a high nurse staff to patient days ratio, the relationship between the LPN variable and cost may be related to some other factor. As discussed in Chapter III, hospitals in Texas used significantly more LPNs (on a per bed basis) and significantly fewer RNs (on a per bed basis) than did the other hospitals. Therefore, it is possible that the positive significant relationship observed in the regression may only be expressing the fact that hospitals in Texas had higher costs per patient day than hospitals in the other two projects. More generally, it is also plausible that hospitals with more intense acute care case mix (not measured in this study) are likely to have higher staffing ratios and, in general, a higher cost structure for the entire facility. This, in turn, could influence incremental cost in the observed directions.

A number of other variables were used to study determinants of cost in this analysis. Included were number of beds, percent Medicare utilization (both acute care and swing-bed care), and quality of care as measured by the routine care quality scores discussed earlier. None of these were significant predictors of incremental cost per swing-bed patient day.

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[5]Conversations with intermediaries and hospital administrators indicate that one advantage from the hospital perspective to providing long-term care using the swing-bed approach is that cost-finding is not required. They have indicated that in the past hospitals have discontinued long-term care units because the required allocation methods unfairly reduced the amount of allowable routine acute care cost (and, therefore, routine acute care reimbursement) by allocating an excessive amount of cost to long-term care units.

While variation in cost occurs partly because input prices vary by region, it was impossible to find a good measure of regional price variation for the items in the nonlabor cost categories included in Method 1 incremental cost (housekeeping, operation and maintenance of plant, dietary, and laundry and linen) in the rural areas considered here. As discussed earlier, forecasts for incremental cost per day based on the swing-bed experimental experiences are also made more difficult for this same reason.

In summary, for all three experimental years, the incremental routine care cost per swing-bed patient day did not exceed $10.00 using the Method 1 calculation and $16.00 with the additional cost centers in Method 2. This compares to an average full routine care cost of approximately $75.00 in 1978. Two important factors in explaining variations in incremental cost are the acute care occupancy rate of the hospital and numbers of swing-bed days provided, with higher occupancy rates and swing-bed utilization associated with lower incremental cost per day.

2. Financial Impact on Participating Hospitals

Table VI.10 presents the average amount of hospital revenue derived from routine swing-bed care. Average revenue per hospital rose from $5,473 in 1976 to $8,510 in 1977 to $15,324 in 1978, increases due almost entirely to the increase in utilization over the years, since per diem reimbursement rates increased only slightly during the same time period. South Dakota hospitals received the greatest amounts of revenue in all three years, followed by central and western Iowa. The differences between the three states were not statistically significant, however. The higher utilization in South Dakota did not result in significantly higher revenues for hospitals in that state because of the lower per diem amounts paid and the relatively high number of intermediate level patients in that state.

Table VI.11 presents total routine swing-bed care revenue as a percentage of total hospital patient care revenue. On the average, swing-bed routine care revenue amounted to 1.18% of total patient care revenue in 1976, 2.15% in 1977, and 2.82% in 1978. This increase was due, at least in part, to the increase in swing-bed utilization over the three years, since acute care occupancy did not drop significantly in the project hospitals and, as just mentioned, the per diem rates increased only slightly. Again, mean differences among the states were not significantly different in any year. Overall, the percentage of patient care revenue resulting from the provision of routine swing-bed care did not exceed 3% in any year. However, as the range of values indicates, for certain hospitals using the project heavily, this percentage was as high as 34%.

Average differences between cost per swing-bed day and swing-bed revenue per day for hospitals in each of the experiments are presented in Table VI.12. Across all hospitals, average revenue per day exceeded Method 1 incremental cost per day by $13.84 in 1976, $24.91 in 1977, and $20.75 in 1978. In all three years, the difference among states

was statistically significant. Since hospitals in Iowa received the highest per diem reimbursement rate ($33 per day in western Iowa and $40 in central Iowa), it is to be expected that the difference would be greatest in that state.

The mean difference between average long-term care revenue per patient

TABLE VI.10:

Total Routine Swing-Bed Care Revenue for Admitting Hospitals by State and Year.

	Texas	South Dakota	Western Iowa	Central Iowa	Total
1976					
Mean (p=.987)[1]	$5,445	$5,868	$4,511	--	$5,473
St. Dev.	8,001	3,879	0	--	6,603
Minimum	741	3,453	--	--	741
Maximum	24,146	10,342	--	--	24,146
No. of Hosp.	8	3	1	--	12
1977					
Mean (p=.468)[1]	$6,784	$11,360	$7,810	$7,929	$8,510
St. Dev.	7,639	10,615	4,086	5,135	8,183
Minimum	257	1,360	275	1,680	257
Maximum	24,839	32,098	11,875	14,400	32,098
No. of Hosp.	19	14	6	5	44
1978					
Mean (p=.114)[1]	$7,636	$19,538	$18,577	$17,148	$15,324
St. Dev.	9,842	14,838	16,342	13,054	13,527
Minimum	825	2,950	3,502	3,033	825
Maximum	37,828	53,684	48,339	64,776	64,776
No. of Hosp.	13	10	6	21	50

[1]Value is the exact p-value, or significance level, associated with the F-test for one way analysis of variance.

Source: Medicare Cost Reports

TABLE VI.11:

Total Routine Revenue for Swing-Bed Care as a Percentage of Total Patient Care Revenue by State and Year for Admitting Hospitals Only.

	Texas	South Dakota	Western Iowa	Central Iowa	Total
1976					
Mean (p=.064)[1]	.86%	1.32%	3.36%	--	1.18%
St. Dev	.88	.79	0	--	1.06
Minimum	.12	.41	--	--	.12
Maximum	2.46	1.87	--	--	3.36
No. of Hospitals	8	3	1	--	12
1977					
Mean (p=.345)[1]	1.37%	3.04%	2.44%	.82%	2.15%
St. Dev.	2.09	4.28	2.87	.46	3.28
Minimum	.03	.28	.02	.29	.02
Maximum	8.67	12.89	7.90	1.46	12.89
No. of Hospitals	19	14	6	5	36
1978					
Mean (p=.144)[1]	1.46%	3.66%	7.03%	2.07%	2.82%
St. Dev.	2.82	4.08	13.36	1.92	5.27
Minimum	.09	.55	.36	.48	.09
Maximum	10.75	13.00	34.20	9.08	34.20
No. of Hospitals	13	10	6	21	50

[1]Value is the exact p-value, or significance level, associated with the F-test for one-way analysis of variance for mean differences.

Source: Medicare Cost Reports

TABLE VI.12:

Average Difference Between Routine Care Revenue and Method 1 and Method 2 Incremental Cost Per Patient Day by Year for Admitting Hospitals Only.

	Difference Between Revenue and Incremental Cost per Swing-Bed Day		
	1976[1]	1977[1]	1978[1]
Texas			
Method 1	$14.32	$16.04	$18.08
Method 2	$10.08	$10.40	$11.81
South Dakota			
Method 1	$11.09	$9.17	$9.75
Method 2	$6.96	$4.33	$4.05
Western Iowa			
Method 1	$17.08	$29.81	$25.41
Method 2	$14.17	$17.98	$20.22
Central Iowa[2]			
Method 1	--	$27.72	$22.01
Method 2	--	$10.42	$14.11

[1]For each year, the across-state means were significantly different ($p<.001$) using a one-way analysis of variance--for both Method 1 and Method 2.

[2]Hospitals in the central Iowa project did not begin admitting patients until June 1977.

Source: Medicare Cost Reports

TABLE VI.13:

Reduction in Medicare Routine Acute Care Reimbursement and Medicare Payments for Swing-Bed Care in 1977 by Project (Admitting Hospitals Only).

	Texas	South Dakota	Western Iowa	Central Iowa
Medicare reduction in routine acute care reimbursement[1]	$53,768	$56,166	$19,565	$14,132
Medicare payments for swing-bed care[1]	$74,205	$54,043	$27,240	$14,728
Net payment[2]	$20,437	-$2,123[3]	$7,675	$596
Net payment per Medicare swing-bed patient day	$6.51	-.67[3]	$11.25	$1.36
Incremental cost (Method 1)	$9.66	$6.84	$7.00	$8.62

[1]Entries for each state represent the total for all admitting hospitals in the state in 1977.

[2]Net payment is the difference between the Medicare reduction and the Medicare payment.

[3]Negative quantities indicate a reduction in total Medicare reimbursement.

Source: Medicare Cost Reports

day and Method 2 incremental cost across the three states is also presented in Table VI.12. Since Method 2 incremental cost is greater than Method 1 cost, the difference is less than between average revenue and Method 1 cost. The differences between states are significant at the .001 level. Iowa hospitals had the greatest difference between incremental cost and revenue per patient day.

While average revenue per swing-bed patient day was sufficient to cover incremental cost in all three states, inadequate reimbursement to hospitals was the problem most frequently cited by administrators in the admitting hospitals. This suggests that, as indicated in Chapter III, administrator dissatisfaction with reimbursement may be the result of the expectation of full cost reimbursement rather than an actual failure of the experimental per diem to cover the incremental costs of care.

Table VI.13 presents the results of the analysis which examined the net effect on Medicare expenditures (net payments) taking into consideration the payment for swing-bed care and the reduction in payments for routine acute care brought about by the offset of swing-bed revenues against total routine care allowable cost. In South Dakota, the reduction in Medicare routine acute care reimbursement was greater than Medicare expenditures for swing-bed care. In the other two states the reverse was true.

In order to determine the extent to which Medicare net payments covered the cost of swing-bed care, a comparison of the net payment per Medicare swing-bed patient day with Method 1 incremental cost per day was made. As indicated, in only one area, western Iowa, did this payment exceed incremental cost.

Medicaid net payments were also examined. In Iowa and Texas, Medicaid swing-bed care was not provided in 1977, but Medicaid did receive a reduction in routine cost in those two states because participating hospitals which provided swing-bed care to Medicare and private pay patients offset swing-bed revenues against Medicaid allowable routine care cost. Consequently, since no additional expenditures were made by Medicaid in those two states, Medicaid experienced a net reduction in reimbursement expenditure.

Since Medicaid reimbursed for swing-bed care in South Dakota, a complete analysis similar to the one described above was done for all swing-bed hospitals in that state. Across all swing-bed hospitals, Medicaid experienced a reduction of $3273 in routine acute care reimbursement and an additional expenditure for swing-bed care of $5176 in 1977. On the average, then, net expenditures were $5.26 per Medicaid swing-bed patient day. This was less than the average Method 1 incremental cost per day of $6.58 in South Dakota.

Both the Medicare and Medicaid analyses reported here examine the impact of the reimbusement system on total project-related reductions in routine care cost and additional expenses for swing-bed care for all hospitals combined. As discussed earlier in Section D, for any

individual hospital, the Medicare/Medicaid net payment will be a function of the proportions of acute care and swing-bed utilization attributable to each of the two programs.

Since Medicare net payments for swing-bed care in 1977 did not cover incremental cost in any of the experimental areas except western Iowa and since Medicaid net payments in South Dakota also did not cover incremental cost, other payers were, in effect, "underwriting" the cost of care to swing-bed patients paid for by these two programs. In this case, since there was little private insurance covering swing-bed patients, it was swing-bed patients (and their families) who paid at a rate greater than incremental cost.

The results presented here are, of course, unique to the experimental conditions. Should the swing-bed approach to providing long-term care be adopted nationwide, the impact on Medicare, Medicaid and private payers will vary as a function of such factors as the overall routine care cost structures of hospitals participating, the extent of Medicaid participation, the per diem charged for swing-bed care, the rate structure for private pay patients (both acute care and long-term care), and overall utilization of the program.

3. Cost-Effectiveness of Swing-Bed Care

Table VI.14 presents the average full routine care cost per patient day in the comparison SNFs and swing-bed hospitals in 1977. As indicated in Section D.5, the cost in the comparison facilities is the cost of skilled level patient care. For each state, and overall, the full cost per day in swing-bed hospitals is significantly higher ($p<.001$) than the corresponding cost in the comparison SNFs. A comparison of both Method 1 and Method 2 incremental cost in the hospitals (not presented here) with full cost in the SNFs has, as expected, the opposite result, with the skilled nursing facilities having significantly higher cost per day.

Table VI.15 presents cost-effectiveness ratios measuring the quality of routine care per dollar of cost incurred with higher ratios indicating higher cost-effectiveness or more quality per dollar of cost. Only SNFs visited as part of the quality study were used in this analysis. For hospitals, three ratios were calculated using the three measures of cost discussed here, Method 1 and Method 2 incremental cost and full cost. Across all hospitals, the average cost-effectiveness scores were 10.61 (based on Method 1 incremental cost), 5.44 (based on Method 2 incremental cost), and 1.10 (based on full cost). The average cost-effectiveness score for all SNFs was 3.24. Observed differences among the three states were not statistically significant for each measure.

Since the average routine quality scores for the two types of facilities did not differ greatly (68.1% for hospitals and 69.5% for SNFs) the differences in cost-effectiveness between the two groups is attributable to differences in cost. Swing-bed care is more cost effective

TABLE VI.14:

Full Routine Care Cost for Admitting Swing-Bed Hospitals and Comparison SNFs in 1977 by State.

	Comparison SNFs	Swing-Bed Hospitals	Signif. Level[1]
Texas			
Mean	$22.28	$72.74	<.001
St. Dev.	7.81	16.22	
Minimum	11.42	54.23	
Maximum	43.59	128.76	
No. of Facilities	23	19	
South Dakota			
Mean	$19.60	$56.74	<.001
St. Dev.	3.70	14.78	
Minimum	14.65	32.45	
Maximum	23.30	86.88	
No. of Facilities	4	14	
Iowa			
Mean	$31.13	$69.54	<.001
St. Dev.	8.66	11.87	
Minimum	15.48	54.23	
Maximum	46.70	97.18	
No. of Facilities	19	11	
Total			
Mean	$25.70	$66.53	<.001
St. Dev.	9.08	15.58	
Minimum	11.42	32.45	
Maximum	46.70	128.76	
No. of Facilities	46	44	

[1]Values are the exact p-values, or significance levels, associated with the two-sample t-test for mean differences.

Source: Medicare Cost Reports

than care provided in SNFs when measures based on incremental cost are used and less cost effective when measures based on full cost are used.

4. Estimation of Costs Under National Implementation

Projections of annual cost to payers in the event of national implementation of the swing-bed program were based on the projections of utilization contained in Chapter IV. Since the utilization estimates are presented using lower and upper bounds, the cost estimates are presented in a similar manner. For routine care cost, the estimated cost was derived by multiplying 749,800 and 1,970,914, the lower and upper bounds of projected utilization, by $8.91, the Method 1 incremental routine care cost per swing-bed patient day in 1978. This yielded a range of estimated routine care cost of from $6.7 million

TABLE VI.15:

Cost-Effectiveness Ratios for Swing-Bed Hospitals and Comparison SNFs in 1977 by Project.

	Comparison SNFs	Swing-Bed Hospitals		
	Full Cost	Method 1	Method 2	Full Cost
Texas	3.17 (N=4)	7.45	4.56	.92 (N=6)
South Dakota	3.52 (N=3)	13.94	6.10	1.17 (N=9)
Iowa	3.13 (N=5)	9.88	5.34	1.13 (N=15)
Total	3.24 (N=12)	10.61 ($p<.001$)[1]	5.44 ($p<.001$)[1]	1.10 (N=30) ($p<.001$)[1]

[1]Value is the exact p-value, a significance level, for the two sample t-test for mean differences between hospital cost-effectiveness (for each measure) and SNF cost-effectiveness.

Source: Medicare Cost Reports

to $17.6 million per year for the provision of swing-bed care.

Projected ancillary expeditures were obtained in a similar manner. The minimum and maximum projected number of patient days given previously were multiplied by $9.97, the average 1977 ancillary care cost per long-term care patient day for Medicare swing-bed patients.

Since Medicare patients are all skilled level, use of this figure may overestimate ancillary cost despite the fact that it pertains to 1977. The resulting amounts ranged from about $7.5 million to $19.5 million per year. Combination of the routine and ancillary care cost projections produced a total cost estimate of from $14.2 million to $37.0 million had the swing-bed program been operating on a national basis in 1978. In 1978, 36.6% of the total experimental swing-bed days were paid for by Medicare. Applying this percentage to the projected costs yields an estimated cost to Medicare of $5.2 million to 13.5 million. This represents approximately 1.3% and 3.4%, respectively, of Medicare expenditures on nursing home care in 1978. Since the percentage of Medicare swing-bed days in the experiments is probably higher than would be observed nationally, these figures may overestimate cost to Medicare and therefore, represent an upper limit on Medicare cost. While results of the utilization component of the evaluation indicate that acute care length of stay may have declined as a result of the provision of swing-bed care, it is difficult to project a similar decline in a nationwide program. Therefore, cost estimates presented here do not take into consideration any possible reductions in expenditures for acute care.

The estimates presented here also do not include the additional administrative expense which would be incurred by either fiscal intermediaries or HCFA itself, since these costs were considered to be relatively small compared to the actual amounts reimbursed for patient care.

5. Summary of Findings

(1) In 1978, the incremental cost of routine care per long-term care patient day averaged $8.91. As mentioned, this estimate is based on the incremental cost formula used as part of the experimental program. Using the calculation formula developed for the evaluation, which included more cost centers, the average was $15.62 in 1978.

(2) Using the standard Ratio of Charges to Charges Applied to Cost (RCCAC) method, the ancillary cost for swing-bed patients was $9.97 per Medicare patient day in 1977. (The most recent year for which data were available).

(3) The full cost of routine care for swing-bed patients was $75 per long-term care patient day in 1978, substantially higher than the incremental cost per day.

(4) The routine cost per long-term care patient day for certified nursing homes in Texas, Iowa and South Dakota averaged $25.70 in 1977. This amount was lower than the full cost of routine care per long-term care day in swing-bed hospitals during the same time period, but higher than the incremental cost per long-term care patient day under the swing-bed program.

(5) Overall, the experimental swing-bed program did not appear to strengthen the financial position of the participating hospitals. Long-term care revenues from routine care averaged 2.82% of total patient care revenue in 1978. In general, long-term care revenue exceeded incremental cost; but the program appears to have had little discernible affect on the financial position of hospitals since the amount of total utilization accounted for by long-term care patients was small. However, for hospitals which used the program heavily, the impact was considerable. For example, one hospital generated 35% of its patient care revenues from swing-bed utilization.

(6) In 1977, the reimbursement system for swing-bed care resulted in the Medicare program experiencing a reduction in routine acute care reimbursement which was greater than increased expenditures for swing-bed care in South Dakota, Texas, and central Iowa. When the reduction in routine acute care reimbursement was subtracted from expenditures for swing-bed care, the resulting amount (the net payment) was less than incremental cost. In South Dakota, where Medicaid reimbursed for both acute and swing-bed care in 1977, the reduction in routine care cost was less than the increase in expenditures for swing-bed care but the net payment was also less than incemental cost for Medicaid patients. In this situation, it appears that private pay patients receiving long-term care in swing-bed hospitals were subsidizing patients paid for by Medicare and Medicaid; that is, private pay patients paid for care at a rate higher than incremental cost.

(7) Because the quality of long-term care is slightly higher in nursing homes than in experimental swing-bed hospitals, and because the incremental cost of long-term care is lower in swing-bed hospitals than in nursing homes; a cost-effectiveness analysis, based on the ratio of quality to cost, was conducted for the two facility types. This assessment indicates that the provision of long-term care in swing-bed hospitals is more cost-effective than providing institutional long-term care in nursing homes, based on the incremental routine cost (rather than the full cost) of long-term care provided in swing-bed hospitals. When full cost is used, the same type of analysis indicates that nursing homes are more cost-effective than swing-bed hospitals.

(8) Projections of the cost of a nationwide swing-bed program in rural areas based upon the estimates of nationwide utilization presented earlier, ranged from $14.2 million to $37.0 million, for all payers. Cost to the Medicare program ranged from $5.2 million to $13.5 million.

This is based upon an estimated range for routine long-term care and ancillary longterm care. These projections do not take into consideration the possibility of a reduction in hospital expenditures should payments for swing-bed care replace current expenses for administratively necessary days. To the extent that a national swingbed program would involve some savings of this sort, expenditures for hospital care may be less than what is projected here.

F. IMPLICATIONS

The implications of the financial analysis, including recommendations on the nature of a reimbursement system for a national swing-bed program, are presented in this section. The recommendations are based on the findings presented in this report and on the comments and suggestions of individuals from the administering agencies, Medicare intermediary offices, state Medicaid agencies, and others knowledgeable about swing-bed reimbursement issues who attended a reimbursement conference on this topic sponsored as part of the evaluation.

Policy Implications

(1) The swing-bed approach represents a cost-effective mechanism of providing routine long-term care when the incremental cost of swing-bed care is compared with routine care cost per day for skilled nursing home care. The use of incremental cost in making this determination is premised on the assumption that from a public policy point of view the appropriate unit of cost is that of additional program expenditure and not necessarily the full cost of care provided. However, should a reimbursement system for swing-bed care be implemented on the basis of full cost, nursing home care would be more cost-effective.

(2) As the findings indicate, incremental cost of routine care per swing-bed care patient day in 1978 averaged \$8.91, as compared with a full cost of approximately \$75 a day. A determination of whether reimbursement should be based on full cost or incremental cost must address the fundamental issue of "cost to whom?" From the hospital perspective, as long as the per diem reimbursement rate is greater than or equal to actual incremental cost, hospitals will be able to at least cover the cost of swing-bed care. From a reimbursement perspective, cost-based reimbursers such as Medicare have traditionally stressed payment based on full cost as a method of equitably allocating the the fixed costs of health care facilities to all classes of patients and payers. However, the approach taken in the swing-bed experiments assumes that, in a situation where excess capacity exists and where Medicare is already paying for a substantial amount of fixed cost (and unused capacity), it is appropriate to pay for additional services for Medicare patients at only incremental or marginal cost rates.

In other words, if Medicare is committed to maintaining hospitals in rural areas to meet the acute and emergency care needs of program beneficiaries, then expenditures for the fixed costs of such hospitals are, in fact, sunk costs and a more efficient use of these facilities can be encouraged by a reimbursement system paying at incremental rates. As such, the swing-bed approach to the provision of long-term care is a cost containing mechanism if the demand for long-term care in rural areas can be met without additional capital expenditures for long-term care facilities.

(3) Guidelines for structuring a swing-bed reimbursement system, along with explanatory comments, are presented below:

(a) Since Medicare, Medicaid, and private payers are the primary sources of institutional long-term care revenues, the recommended reimbursement guidelines presented here pertain to these three payer groups.

(b) The reimbursement procedures suggested are intended to cover the incremental cost of long-term care rather than the full cost of such care.

(c) The recommended procedure is such that the total portion of hospital cost reimbursed by any given payer may differ slightly from the actual incremental cost of patient care attributable to patients covered by that payer.

(d) The recommended procedure maintains a crucial element of the experimental system which is that cost-finding will not be used to determine the incremental cost of swing-bed care but, instead, long-term care revenues will be treated as an approximation to cost and offset against routine care cost. It is more likely that hospitals will use the swing-bed approach when it is handled in this manner because of the administrative ease with which this can be incorporated into the hospital's current record keeping and cost reporting practices.

(1) Medicare

(a) Routine Care. Medicare would reimburse only for skilled level care by prospectively establishing a per diem rate equal to the fiftieth percentile (median) of the Medicaid skilled level average cost per day for nursing homes in each state. If the state Medicaid program uses standard inflation or other adjustment factors based on region or facility characteristics, a similar procedure would be used in setting the Medicare swing-bed per diem. The Medicare acute care settlement would require the hospitals to (1) calculate routine costs without attempting to separate costs incurred due to

the provision of long-term care and (2) reduce the calculated routine costs by the amount of long-term care revenues (net of bad debts, etc.) from all payers (Medicare, Medicaid, private pay, etc.). This routine care reimbursement procedure represents a departure from traditional Medicare practice in that it is based on covering the cost of all services, but is intended only to ensure that the incremental cost of swing-bed care is covered. Implementation of such a procedure may result in requests for similar treatment of other hospital services and may therefore bring about a reconsideration of Medicare reimbursement policy in other areas.

(b) Ancillary Care. Medicare reimbursement for ancillary services received by swing-bed patients would be handled as is currently the case in the experimental program. This would require no change in current Medicare reimbursement policy for ancillary services provided in acute care hospitals.

(2) Medicaid

(a) Routine Care. Where possible, Medicaid programs should use the same rate as Medicare, which is in fact based on Medicaid costs and calculated using the procedure described above, when reimbursing for skilled nursing care. In addition, the Medicaid rate(s) for intermediate care should be set at the fiftieth percentile of Medicaid cost per day for intermediate care delivered in free-standing facilities. For states which employ more than one level of skilled and/or intermediate care, the Medicaid rates for swing-bed hospitals should be established according to these categories. Further, in those instances where states use adjustments for inflation or for facility or regional differences, this should be built into the Medicaid routine care per diem for long-term care provided in swing-bed hospitals. Where the Medicaid settlement for acute care provided in hospitals is based on cost finding and reporting procedures similar to those of the Medicare program, the offset method for routine care reimbursement described under (1)(a) above should be used for the acute care settlement.

(b) Ancillary Care. Three alternatives are suggested, with each state Medicaid program electing the alternative which best suits its current policy and practices:

a. Where possible, current Medicare methods should be used.

b. Where state nursing home practices currently use such an approach, state per diem payments for swing-bed care should be inclusive of ancillary care reimbursement

c. When in accordance with current state practices, a fee-for-service system should be used.

(3) Private Payers

Although it is beyond the purview of Medicare and Medicaid regulations, it is recommended that the charge structure for private pay patients who receive long-term care services in swing-bed hospitals be the same as that for Medicaid patients. Some state laws, such as in Minnesota, currently require that public and private payers be charged the same for nursing home care.

(4) As the findings indicate, the total increase in expenditures due to the implementation of the swing-bed concept on a nationwide basis in rural areas only would be in the range of $14.2 to $37.0 million, based upon 1978 costs. The impact of such an addition on total national hospital care expenditures would be minimal, since the additional costs would represent an increase of between .02% and and .05%.

(5) With respect to the financial position of swing-bed hospitals, it is clear that hospitals will benefit significantly only where there is a major increase in utilization due to the availability of swing beds. Unless utilization is substantial, other major problems often encountered by rural hospitals, such as inflation, a declining population base, and difficulty in recruiting qualified staff members, can offset financial benefits obtained through participation in a swing-bed program. However, since the findings in Chapter III indicate that increased revenue was not the primary motivation for participation in the experiment, the failure of the swing-bed concept to make a large difference in hospital revenues should not act as a significant deterrent to hospital participation in a swing-bed program.

Research Implications

(1) The development of an appropriate reimbursement policy to foster the efficient use of excess hospital capacity, using the incremental approach discussed here, depends on a knowledge of basic cost behavior in different types of facilities and in different locations. For example, excess capacity is generally assumed to exist in facilities with low occupancy rates, but in fact may exist in varying degrees on a departmental basis throughout a hospital.

Hence, programs designed to use this capacity should be developed with this in mind. A breakdown of hospital costs into an assessment of fixed and variable by department and an understanding of how this categorization might change with varying levels of utilization and with different types of care provided (such as swing-bed care) would be necessary in establishing reimbursement rates which would cover actual incremental costs of care delivered. Therefore, additional research work in the area of fixed and variable costs should be undertaken with this reimbursement perspective in mind.

(2) As part of this evaluation, a regression analysis (described in Section D.2) was employed to predict what routine care costs would have been in the absence of swing-bed care. Any additional costs were then attributed to the experimental program. The results of this analysis were estimates of incremental cost which seemed high in light of the overall low utilization observed in the programs and the knowledge that no additional expenditures for labor or capital were reported. However, it appears that this approach can be refined (perhaps with more sophisticated ways of grouping hospitals) to more accurately predict cost and thereby yield a method of monitoring and analyzing cost behavior as the swing-bed program becomes more widely used.

CHAPTER VII

POLICY CONCLUSIONS

A. INTRODUCTION

The evaluation described in this report was designed for two general purposes. First, it was intended to provide information relevant to a policy decision on whether to extend the swing-bed approach beyond the experimental stage to national implementation. Second, given the possibility that attainment of the first objective would result in a recommendation to proceed with a national program, the study was designed to anticipate problems and provide guidelines pertinent to more widespread implementation of the swing-bed approach. With respect to the first objective, the results of this study suggest that a swing-bed program should be implemented in rural communities nationally. General conclusions, potential problems, and specific recommendations associated with national implementation are contained in the implications presented throughout this chapter.

The general recommendation to establish a national swing-bed program is premised on (1) an unmet demand for long-term care which appears to exist in many rural communities, (2) the assumption that the satisfaction of this demand is socially desirable and will enhance the public welfare, (3) the conclusion that many rural hospitals can and will provide such care in an adequate manner if proper quality assurance steps are taken, and (4) the fact that the cost of swing-bed care will not exceed the cost of comparable care provided in other settings. It should be emphasized that this study was not designed to analyze the cost-effectiveness of every possible alternative to providing long-term care in rural communities. Nonetheless, the most realistic and available alternative for rural communities, nursing home care, was examined. The study conclusions are thus premised on an assessment of the demand for and cost of the two most pragmatic alternatives for long-term care in rural communities, i.e., swing-bed care and nursing home care, as well as the quality of care associated with each alternative. It should also be emphasized that some differences existed among the experiments, that the experimental hospitals were located in small midwestern communities, that hospitals were smaller and had lower occupancy rates than most rural hospitals, and that the implications presented here either take these factors into consideration or are qualified as appropriate.

The general suggestions for implementation of a swing-bed program may be categorized into four areas: provider eligibility, reimbursement, quality assurance, and orientation/information dissemination. The following remarks summarize the major conclusions in these areas, which are subsequently discussed in greater detail in Section B.

With respect to provider eligibility, the recommendations which follow state that rural hospitals throughout the country should be allowed to provide swing-bed care. That is, they should be eligible to receive

Medicare and Medicaid reimbursement for long-term care provided in swing beds in accord with certain reimbursement and quality assurance guidelines. Individual states should then be permitted to impose further restrictions through the certificate of need process.

Medicare and Medicaid reimbursement should be structured to ensure that the incremental cost of long-term care provided in swing beds will be covered. The establishment of a per diem reimbursement rate on the basis of nursing home cost experience along with a revenue offset method for reimbursement would accomplish this and, at the same time, provide the basis for a reasonably cost-effective approach for all payers, including private payers.

The quality component of this evaluation has indicated that acute care hospitals are capable of providing adequate long-term care, but are less likely to provide certain non-medical services in as adequate a manner as many nursing homes. Hospital-based long-term care provided in swing beds should thus be subject to standard PSRO review procedures. Furthermore, hospitals should be required to satisfy some, but not all, of the Medicare/Medicaid conditions of participation which regulate skilled nursing facilities.

Orientation/information dissemination is critical to the success of a national swing-bed program, especially in terms of patient care practices and overall program management. Clearly written guidelines for physicians and nurses on the provision of long-term care and the differences between long-term and acute care should be available and disseminated to each eligible hospital. Similarly, administrative guidelines detailing reimbursement policy, forms completion, and anticipated hospital-level problems should be disseminated to hospital administrators. Planning and fiscal agencies (including Medicare intermediaries and state Medicaid programs) should also be provided information on various system-wide regulatory and financing considerations.

Each implication discussed below falls either into the category of broad conclusions and potential problems, or into one of the previously mentioned areas of provider eligibility, reimbursement, quality assurance, and orientation/information dissemination. Some implications pertain to more than one such category. For clarity of exposition, however, the implications are presented according to generic health care or regulatory topic areas which lend themselves to policy considerations.

B. PROGRAMMATIC IMPLICATIONS

1. General Recommendations on National Implementation

The results of this study suggest that a swing-bed program should be implemented nationally. Five general findings constitute the rationale behind this recommendation:

(a) An unmet demand for institutional long-term care exists in many rural communities. The results of this study indicate that the long-term care utilization experience of the swing-bed hospitals

was not due to a diversion of long-term care patients from nursing homes, but instead represents a demand which previously had not been met. It appears, therefore, that many rural communities may be in need of additional long-term care beds. Moreover, the availability of swing beds in rural areas reduces travel time and related inconveniences for the families and friends of long-term care patients, thereby increasing the likelihood of a stronger social support system for the long-term care patient.

(b) Assuming it is desirable to service the institutional long-term care needs of rural communities in a more effective manner than is presently being done, the swing-bed approach appears to be the most <u>cost-effective</u> (based on incremental cost) means to do so. While the total cost of health care in this country would increase slightly with the inception of this program (as indicated in Implication 4 below), the unit cost, i.e., cost per long-term care patient day, under a swing-bed approach would be less than the cost associated with providing similar care in nursing homes.

(c) The <u>quality</u> of long-term care provided in swing-bed hospitals is adequate. While the experimental hospitals as a group did not provide care as well as comparison nursing homes, the discrepancy was not substantial. In addition, the comparison nursing homes were regarded as above average, and the discrepancy is likely to disappear over time both with the proper quality assurance steps and as the staffs of swing-bed hospitals become familiar with the special problems of the long-term care patient.

(d) Although the swing-bed concept has encountered some resistance, there was, in general, <u>an acceptance</u> among hospital staff in the experimental setting. At the administrative and patient care levels there appear to be no insurmountable obstacles which would substantially impede the provision of swing-bed care in rural hospitals. The problems encountered can very likely be dealt with over the course of time using appropriate orientation and information dissemination procedures such as those suggested in subsequent implications.

(e) The swing-bed approach represents a method of <u>rural hospital diversification</u>. An acute care hospital in a rural area is often highly important to the economy of the community. Further, while the value of retaining an acute care hospital to service the emergency and acute care needs of a rural community may be difficult to measure, it is generally regarded as substantial, especially by community residents. The swing-bed approach, therefore, should be viewed as beneficial in more ways than those directly related to the long-term care needs of rural areas, and is in keeping with the current movement to encourage rural hospitals to become involved in a more diversified program of health care (and even non-health care) service delivery.

2. Provider Eligibility Under a National Program

Initially, hospital participation in a national swing-bed program should be restricted to (1) hospitals located in rural areas (i.e., outside Standard Metropolitan Statistical Areas, as defined by the U.S. Census Bureau), and (2) hospitals which have satisfied state level certificate of need requirements to provide long-term care. Since the experimental programs took place only in rural communities, it was beyond the scope of this evaluation to determine either the existence of unmet demand in metropolitan areas or the ramifications of implementing a swing-bed program in such communities. A large number of factors peculiar to the urban environment (and not examined in this evaluation) have the potential to influence cost, utilization, and the quality of long-term care which would be provided in swing-bed hospitals. For this reason, therefore, it is recommended that eligibility be initially restricted to rural hospitals with possible future experimentation and research designed to assess the appropriateness of swing-bed care in metropolitan areas.

In order to provide maximum flexibility, no overall limitations on hospital participation (except for the restriction to rural locations) such as the experimental limits on hospital bed size, acute care occupancy, or long-term care utilization, are recommended. Instead, the decision on whether swing beds are needed at the local level should be the responsibility of state level certificate of need agencies. Such agencies are often in a better position to ascertain the need for additional long-term care beds in rural communities and should be left free to impose those limitations on hospital eligibilty which are most appropriate at the state level.

3. Utilization Projections

It is not possible to precisely estimate the utilization which will occur if a swing-bed program is implemented nationally. Several factors render it difficult to forecast utilization: (1) payers participated to differing degrees across the various experiments; (2) the distribution of patients within different levels of long-term care varied from experiment to experiment; (3) reimbursement procedures differed; (4) administrative practices differed at both the hospital and state levels; and (5) it is not possible to stipulate the precise eligibility and regulatory conditions which might be associated with a national program. Nevertheless, it is possible to predict utilization within very broad ranges:

(a) If the program is implemented nationally using the eligibility criteria of location in a rural area and satisfaction of state certificate of need requirements, swing-bed utilization in rural hospitals is likely to total between 750,000 and 1,971,000 long-term care days per year within one to two years following implementation of the program.

(b) This would represent a 0.21% to 0.56% increase in institutional long-term care utilization nationally.

4. Cost Projections

As indicated in Chapter II, routine care refers to basic room and board, nursing, and related services, while ancillary care refers to services such as diagnostic, laboratory, and x-ray services which are normally provided on a discretionary basis in accord with individual patient needs.

(a) Routine Cost Projections. The incremental cost to the swing-bed hospital of providing routine long-term care averaged $8.91 per patient day in 1978. Employing the eligibility criteria given in Implication 2 and multiplying this incremental cost by the projected number of days given in Implication 3 yields a routine cost range of between $6.7 and $17.6 million per year for the provision of swing-bed care.

(b) Ancillary Cost Projections. Using the standard Ratio of Charges to Charges Applied to Cost (RCCAC) method, the ancillary cost for Medicare swing-bed patients was $9.97 per long-term care patient day in 1977 (the most recent year for which data were available). Multiplication by the utilization figures given earlier yields an estimated ancillary cost of between $7.5 and $19.5 million if the program had been operated on a national basis in rural areas.

(c) Total Cost Projections. The total cost of implementing a rural swing-bed program from the perspective of cost to the hospital (and ultimately to payers and consumers) is the sum of the appropriate figures given in (a) and (b) above; and thus, the total cost if the program had been implemented in 1978 would have been between $14.2 and $37.0 million.[1] (It is estimated that Medicare would have incurred less than $13.5 million of this cost.) The impact of such an addition on total national hospital care expenditures would be minimal, since the additional costs would represent an increase of between .02% and .05%. From the point of view of unit cost, however, the swing-bed approach represents a cost containment mechanism when the incremental cost of routine care for swing-bed hospitals, $8.91 per day, is compared with the routine cost of $25.70 per day associated with skilled nursing home care.[2] Further, this expected

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[1]These figures slightly underestimate total costs for 1978 since ancillary cost projections were based on data available only for 1977. In order to project costs for 1981 or future years, it is appropriate to apply an inflation factor to the figures presented here.

[2]This evaluation has provided some evidence to suggest that acute care length of stay may be decreased for patients who are transferred from acute care to long-term care in swing-bed hospitals. It is possible, therefore, that acute care costs might be reduced in locations where patients are "held" in acute care status due to the lack of long-term care beds in the area.

one time rate of increase in cost, between .02% and .05%, is substantially less than the annual inflation rate in hospital costs.

(d) Administrative Costs. This evaluation has dealt largely with cost to the hospital, which is ultimately passed on to reimbursers and consumers in a manner determined by reimbursement procedures. The administrative costs (both to hospitals and payers) of reimbursing for swing-bed care are regarded as negligible relative to the actual cost of patient care.

5. Reimbursement Guidelines

Since Medicare, Medicaid, and private payers are the primary sources of institutional long-term care revenues, the recommended reimbursement guidelines presented here pertain to these three payer groups. The reimbursement procedures suggested are intended to cover the incremental cost of long-term care rather than the full cost of such care. The recommended procedure is such that the total portion of hospital cost reimbursed by any given payer may differ from the actual incremental cost of patient care, depending on the percentage of long-term care and acute care utilization attributable to patients covered by that payer. The recommended procedure, moreover, maintains a crucial element of the experimental system which is that cost finding will not be used to determine the incremental cost of swing-bed care; instead, long-term care revenues will be treated as an approximation to cost and offset against routine care cost. It is more likely that hospitals will use the swing-bed approach when it is handled in this manner because of the administrative ease with which this can be incorporated into the hospital's current record keeping and cost reporting practices.

(a) Medicare

(1) Routine Care. Medicare would reimburse only for skilled level care by prospectively establishing a per diem rate equal to the fiftieth percentile (median) of the Medicaid skilled level average cost per day for nursing homes in each state. If the state Medicaid program uses standard inflation adjustments or other factors based on region or facility characteristics, a similar procedure would be used in setting the Medicare swing-bed per diem. The Medicare acute care settlement would require the hospital to (a) calculate routine costs without attempting to separate costs incurred due to the provision of long-term care and (b) reduce the calculated routine costs by the amount of long-term care revenues (net of bad debts, etc.) from all payers (Medicare, Medicaid, private pay, etc.).

This routine care reimbursement procedure represents a departure from standard Medicare practice in that it is not based on full cost of services, but is intended only to ensure that the incremental cost of care is covered. Implementation of such a procedure may result in requests for similar treatment

of other hospital services and may therefore bring about a reconsideration of Medicare reimbursement policy in other areas.

(2) Ancillary Care. Medicare reimbursement for ancillary services received by swing-bed patients would be handled according to standard Medicare procedure. That is, hospitals would be required to determine the cost of ancillary services to swing-bed patients using the Medicare Ratio of Charges to Charges Applied to Cost (RCCAC) method. This would require no change in current Medicare reimbursement policy for ancillary services provided in acute care hospitals.

(b) Medicaid

(1) Routine Care. Where possible, Medicaid programs should use the same rate as Medicare (calculated using the procedure described above), which is, in fact, based on Medicaid cost experience, when reimbursing for skilled nursing care provided in hospital swing beds. The Medicaid rate(s) for intermemediate care should be set at the fiftieth percentile of statewide Medicaid cost per day for intermediate care delivered in freestanding facilities. Where appropriate, for states which employ more than one level of skilled and/or intermediate care, the Medicaid rates for swing-bed hospitals should be established according to these categories. Further, in those instances where states use adjustments for inflation, facility, or regional differences, this should be built into the Medicaid routine care per diem for long-term care provided in swing-bed hospitals. The offset method for routine care reimbursement described under (a.1) above should be used for the acute care settlement.

(2) Ancillary Care. Three alternatives are suggested, with each state Medicaid program electing the alternative which best suits its current policy and practices:

(a) where possible, the Medicare RCCAC method should be used;

(b) where state nursing home practices currently use such an approach, state per diem payments for swing-bed care should be inclusive of ancillary care reimbursement;

(c) when in accordance with current state practices, a fee-for-service system should be used.

(c) Private Payers

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[3]However, the certified skilled nursing facilities used in the quality study may well have been above average with respect to the care provided in each facility.

Although it is beyond the purview of Medicare and Medicaid regulations, it is recommended that the charge structure for private pay patients who receive long-term care services in swing-bed hospitals be the same as that for Medicaid patients. Some states, such as Minnesota, currently require this by state law.

6. Levels of Care

The swing-bed evaluation has demonstrated that the quality of care provided to skilled nursing patients is slightly lower in swing-bed hospitals than in skilled nursing facilities.[3] The evaluation also showed that the quality of care provided to intermediate care patients in swing-bed hospitals is slightly below that provided to skilled level patients. Yet, since these differences are not substantial and appear likely to decrease over time, it is recommended that swing-bed hospitals be allowed to provide both skilled and intermediate care subject to the regulatory criteria given in Implication 7.

Although custodial or residential care is more likely to be provided by nursing homes than swing-bed hospitals, it is recommended that hospitals not be restricted from providing such care. The rationale behind this recommendation is that many states currently allow hospitals to classify private pay patients as acute care patients, charging them whatever they wish. Thus, if hospitals preferred to provide custodial care and classified the patient as an acute care patient, charging the individual patient at a lower rate, it could not be restricted from doing so. Nonetheless, the evidence produced by this evaluation regarding the quality of care available for residential care patients in swing-bed hospitals is inconclusive. There is some concern that swing-bed hospitals may not be able to provide the social and emotional support services needed by such patients as well as nursing homes.

7. Quality Assurance for Long-Term Care Patients in Swing-Bed Hospitals

The following findings and general observations are pertinent to the issue of quality assurance: (1) many hospital personnel were not familiar with or experienced in treating the needs of long-term care patients; (2) swing-bed hospitals tended to be inadequate, relative to nursing homes, in treating the patient problems of depression, loneliness, isolation, and lack of socialization; (3) nursing homes appeared to be more capable of providing social-recreational and therapeutic-mental health services; (4) swing-bed hospitals provided lower quality of care to intermediate level patients (who often have fewer medical and more psychosocial problems) than skilled level patients; and (5) written discharge plans were not present for the majority of long-term care patients in swing-bed hospitals. As a result, it is recommended that a national swing-bed program implement the following quality assurance measures.

(a) Enforce the section of the Medicare/Medicaid conditions of participation for skilled nursing facilities on staff development (CFR 405.1121 (h)) which states, "An ongoing program is planned and conducted for the development and improvement of skills of

the facility's personnel, including training related to problems and needs of the aged, ill, and disabled."[4] This requirement would assist in orienting swing-bed hospital personnel to the special needs of long-term care patients, an area where hospitals appear to be deficient.

(b) Enforce the Medicare/Medicaid conditions of participation for social services (CFR 405.1130 (a)-(c)). This requirement is designed to meet the special social and emotional needs of long-term care patients. It requires that these needs be identified and that appropriate services be provided by hospital staff, or by referral to providers outside the hospital.

(c) Enforce the major provisions of the Medicare/Medicaid conditions of participation for patient activities (CFR 405.1131 (a)-(b)). In the provision of patient activity programs, the swing-bed hospitals need not be required to provide separate dining and patient activity rooms. This requirement is intended to promote the physical, social, and mental well-being of the patients without burdening hospitals with additional capital costs which would not be justified on the basis of small long-term care case loads. To the extent that swing-bed hospitals have excess space capacity, they should be encouraged to provide additional space for long-term care patient activities in a flexible manner.

(d) Enforce the Medicare/Medicaid discharge planning standard (CFR 405.1137 (h)). This requirement will help ensure continuity of care for long-term care patients discharged from swing-bed hospitals. Such patients, unlike typical acute care patients, usually need institutional care after discharge from the facility.

(e) Include swing-bed patients under PSRO and Medicaid long-term care review programs which are currently being implemented in many areas. Participation in such programs would serve to ensure against inappropriate patient placement and also serve a continuing education role of potential value to hospital staff members involved in the provision of long-term care.

8. <u>Information Dissemination</u>

The innovative nature of the swing-bed concept increases the importance of information dissemination in explaining the various aspects of the program to eligible hospitals. The following recommendations pertain to this function.

(a) Under a national swing-bed program, information dissemination on all topics (with the exception of reimbursement which is discussed in (c) below) should consist of written materials sent to all eligible hos-

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[4]References are to the Code of Federal Regulations.

pitals. These materials, which might be based on those prepared for the orientation programs carried out in the experiments, should be revised to reflect the experience of hospital administrators, directors of nursing, chiefs of staff, and staff physicians in participating hospitals. In addition to the specific items discussed under (b) and (c) below, the following general topics should be covered:

(1) Potential benefits to hospitals, patients, and communities;

(2) Explanation of applicable regulations and eligibility requirements, especially certificate of need requirements and any conditions of participation not waived for swing-bed hospitals.

(3) A general description of the difference between acute and long-term care patients, emphasizing the special needs of long-term care patients and the changed roles which hospital medical and nursing staff must play in providing long-term care.

(b) In the area of quality of care, the written materials should consist of guidelines and educational materials which concentrate on the provision of long-term care to patients who need more restorative and social services than the typical acute care patient. This information should focus on the appropriate provision of restorative, general medical, nursing, and physician services to long-term care patients, and should also describe the services required by the SNF conditions of participation recommended for enforcement in this report as well as any other conditions of participation which may be required. In this regard, it may be appropriate to consider the criteria sets used in the quality component of this evaluation as the basis for such a program. The criteria sets were constructed for purposes of assessing the quality of care provided to swing-bed patients and can be utilized, therefore, to provide recommendations for specific areas where hospitals are deficient.

(c) In the area of reimbursement, use of an orientation approach, rather than reliance on written materials, is recommended for two reasons. First, while reimbursement-related problems were relatively common, they were due in large measure to a lack of understanding of the incremental cost concept. Second, there already exists a formal mechanism, the network of Medicare fiscal intermediaries, which can carry out this orientation function with a relatively small additional expenditure of time and money. Topics covered would include: (1) rationale for incremental cost reimbursement; (2) actual reimbursement procedures for routine and ancillary long-term care; (3) relationship of per diem incremental reimbursement to incremental cost; (4) effect of swing-bed care reimbursement on acute care allowable cost and reimbursement; (5) effect of swing-bed care on total hospital reimbursement; (6) required changes in claims procedure; and (7) required changes in cost reporting. The findings presented in Chapter VI of this report can provide the basis for the information used to cover points (3) through (5) above.

9. Hospital Incentives

The two primary incentives associated with the provision of long-term care in hospitals in rural communities are:

(a) Community Service. The most commonly cited incentive for the provision of swing-bed care is likely to be the benefit which accrues to the community in which the hospital is located. This will result from both increased availability of adequate institutional long-term care and the continued presence of an acute care facility which is enhanced by the provision of long-term care.

(b) Diversification. The swing-bed approach will increasingly be viewed by hospital staff as an opportunity to increase hospital efficiency and to move toward diversification of rural hospital service programs with the ultimate goal of increasing the organizational and fiscal viability, as well as community value, of rural hospitals.

10. Expected Problems in Implementation

(a) Reimbursement. The accounting and financial capabilities of rural hospitals are not as sophisticated as those of larger metropolitan hospitals. It is likely that hospital administrative staff will have difficulty with the reimbursement policies and processes associated with providing a new type of care. The offset method of reimbursement recommended in Implication 5 is novel in the hospital setting and it is reasonable to anticipate that the concept of basing reimbursement on incremental cost initially will appear inequitable from the hospital perspective. For these reasons, it is important that reimbursement policy be clearly stated, straightforward, and well understood from the outset.

(b) Patient Care and Quality Assurance. Hospital medical, nursing, and administrative staff will have certain difficulties adjusting to the different health care needs and service requirements of long-term care patients. In particular, the greater emphasis on rehabilitative and maintenance services associated with long-term care and the psychosocial nature of many long-term care problems will require adjustments by the hospital staff which should be expected to take place over the course of time. The quality assurance recommendations in Implication 7 and written patient care guidelines and educational programs in Implication 8 should be seriously considered and efficiently implemented.

(c) Resistance to Change. Although a national swing-bed program will ultimately be of benefit to rural hospitals and patients alike, it is reasonable to expect initial resistance to the program in many rural communities. This resistance will arise from a natural aversion to "federal intervention", the attitude on the part of some that an acute care hospital "should not become a nursing home", and a general concern about changing the role of acute care hospitals in certain communities. A national swing-bed program should

definitely be voluntary and supportive of an expanded referral network among swing-bed hospitals and nursing homes.

(d) State Level Considerations. Issues of licensure and rate regulation must be dealt with at the state level. State licensure policy may require that both hospitals and hospital administrators receive institutional and professional licenses, respectively, in order to provide long-term care in rural hospitals. Given that the intent of licensure is to ensure that a minimal level of care is provided, it is recommended that professional and institutional licensure requirements at the state level be waived for hospital administrators and swing-bed hospitals--in view of the quality assurance recommendations provided here and the fact that hospital staff and administrators are normally experienced in the provision of medical care. In addition, state level hospital rate commissions and, where appropriate, nursing home rate setting agencies must be appraised of the reimbursement and financial aspects of a national swing-bed program at the state level.

(e) Transition Between the Experiments and a National Program. Should Congress decide to implement a swing-bed program, it is possible that the experimental projects will end before federal enabling legislation takes effect. During the course of the experiments, several extensions were granted as the projects neared scheduled completion dates. The uncertainty as to whether the projects would continue created problems at the community, hospital, and patient levels. To avoid these difficulties, it is recommended that legislation allow the current experimental hospitals to continue to provide swing-bed care prior to the official implemenation date of a national program.

(f) Rural Hospitals Which Currently Provide Long-Term Care. While the substantial majority of rural hospitals are not involved in the provision of long-term care, some hospitals do have certified distinct-part facilities, own or manage nearby nursing homes, or are involved in long-term care in some manner. It is recommended that the swing-bed program apply only to the acute care beds in such institutions. Specifically, hospitals should continue to be reimbursed in accord with standard long-term care reimbursement policy for care provided in already-existing long-term care beds. If the swing-bed reimbursement procedure were applied to care provided in existing long-term care beds, it would imply that such beds could also be used to provide acute care. This would lead to the need to count such beds as both acute and long-term care beds, raise issues of certification and accreditation, and in general, lead to regulatory, reimbursement, administrative, and patient care problems which need not occur in the context of this type of program. Hence, it is recommended that a swing-bed program pertain to existing acute care beds in rural hospitals, not to existing long-term care beds.

11. Swing-Bed Care in the Context of Current Trends in Health Care

(a) Finance. Concerns about health care cost containment will continue to give rise to programs based on efficient utilization of existing health care facilities. The swing-bed program and the experimental reimbursement scheme, a variant of which is recommended in Implication 5, are consonant with increased concerns about flexible reimbursement and cost-effectiveness in health care.

(b) Long-Term Care. During the past several years that portion of our population which requires institutional long-term care has received increased attention. Such attention is appropriate and will continue to grow over the next decade. The swing-bed program represents one of several responses to the need to provide adequate health care to a continually increasing proportion of individuals requiring long-term care in this country.

(c) Diversification. As mentioned earlier, the trend toward an expanded service mix for rural hospitals has been established during recent years. The swing-bed program represents one of several mechanisms for increasing the viability of the rural hospital and its benefit to the rural community.

(d) Quality Assurance. Health care quality assurance has taken on increased importance during the past decade. The quality component of the evaluation discussed in this report, the recommendations regarding quality assurance, and the increased activities in long-term care quality asssurance all are in keeping with this trend. If the swing-bed program is implemented nationally, the quality assurance program which accompanies it must clearly be in keeping with the general trends in quality assurance issues and policies.

(e) Rural Health. It is generally recognized that the problem of access to adequate health care persists in rural communities. Valid cost containment efforts have given rise to suggestions that hospitals in many rural communities ought to be closed. Yet, it is also recognized that a program designed to close a large portion of rural hospitals is likely to intensify the access problem in rural communities. The swing-bed program not only assists in increasing access to long-term care, but it also represents a means of efficiently assisting in the preservation of existing acute care facilities for rural residents.

(f) Experimentation and Evaluation. Certain governmental and non-governmental organizations have emphasized and supported the need for experimentation with different approaches to health care prior to implementing new health care policy on a broad scale. The swing-bed experimental and evaluation programs are part of this growing trend. Although the experimental program has not provided answers to all possible questions regarding national implementation, it has provided a substantial amount of objective information upon which to base policy decisions.

C. RESEARCH IMPLICATIONS

1. Extension of Swing-Bed Care

Consideration of whether the swing-bed program should be extended to hospitals in metropolitan areas entails a number of factors which the rural swing-bed experimental and evaluation program was not intended to address. For example, problems of access to both acute and long-term care, the range of health care facilities available to consumers, referral networks among different types of health care providers (including physicians, nursing homes, and hospitals), the presence of multiple long-term care facilities, lifestyle, community attitudes, and community economics are substantially different in metropolitan and rural areas. Yet, as the percentage of individuals in need of long-term care, especially the elderly, increases, there is reason to ask whether the supply of nursing home beds in metropolitan areas will continue to meet institutional long-term care needs. Given that such needs might best be served by hospitals offering swing-bed care, a demonstration project which would allow for the provision of swing-bed care in several metropolitan areas might be of value in determining whether and how a swing-bed program should be extended.

2. Cost and Quality

Issues of health care cost, financing, and reimbursement will continue to receive increased attention. However, decisions as to how certain types of health care programs should be financed should be based not only on program costs, but on expected benefits. Many health care decisions in the past have been made under the assumption that the quality of care to be provided under a particular program would be adequate. Basically, such decisions rest on the assumption that the "effectiveness" portion of a cost-effective program is a foregone conclusion. Research and policy deliberations should continue to stimulate and foster the appropriate measurement of the quality of care, especially in terms of the provision of adequate services for specific patient problems or typologies. The influence of the provision of services on changes in health status should also continue to be studied. Information collected through studies aimed directly at measuring quality would facilitate decision making associated with implementation, change, or discontinuation of various types of health care programs.

3. Experimentation and Evaluation

The utility of experimentation with a particular health care program of potential value is currently being demonstrated through several efforts. This approach to decision making is not without its problems, however. It requires planning and patience, and occasionally runs counter to the time frame of policy deliberations designed to implement a program either without experimentation or before information generated through a demonstration project is available. Issues of health care cost and quality, trade-offs among them, concerns regarding the most cost-effective alternatives for meeting specific

health care needs, national health insurance, etc., will continue to increase in importance and should be addressed from the perspective of an empirical information base as well as conceptual reasoning. An empirical approach to the evaluation of potential health care programs is consistent with the need to support adequate information collection and dissemination on the structure and performance of our nation's health care system.

4. Flexible Reimbursement and Regulation

The evaluation documented by this study has recommended a method of reimbursement which follows from estimating the incremental cost of long-term care, establishing a payment rate which covers and slightly exceeds incremental cost, and offsetting long-term care revenues against acute care costs. This reimbursement procedure has been suggested since the most accurate reimbursement mechanism, which would be based on a detailed determination of the true cost of swing-bed care, would substantially increase the overall cost of the program. In the process of making this recommendation, a trade-off between excess cost and overall equity to payers was carefully weighed. The recommended reimbursement scheme requires a greater degree of flexibility in Medicare and Medicaid reimbursement policy than more detailed accounting schemes might require. Yet, from the point of view of overall cost-effectiveness, the offset method of reimbursement seems appropriate for a swing-bed program. Health care reimbursement and regulatory policy in this country is large-scale and somewhat cumbersome. Research on increasing regulatory and reimbursement flexibility should therefore be conducted with a view toward an evolving and continually changing regulatory system which will foster rather than impede costeffective approaches to health care.

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APPENDIX A

SWING-BED EXPERIMENT
PARTICIPATING HOSPITALS

SWING-BED EXPERIMENT PARTICIPATING HOSPITALS

Hospital	Town	County
TEXAS		
Shackelford County Memorial	Albany	Shackelford
Big Bend Memorial	Alpine	Brewster
*Angleton-Danbury General	Angleton	Brazoria
Anson General	Anson	Jones
Archer County	Archer City	Archer
*Ballinger Memorial	Ballinger	Runnels
Bastrop Memorial	Bastrop	Bastrop
Bellville General	Bellville	Austin
*Reagan Memorial	Big Lake	Reagan
Heart of Texas Memorial	Brady	McCulloch
Shepperd Memorial	Burnet	Burnet
*Newton Memorial	Cameron	Milam
*St. Edward-Rischar Memorial	Cameron	Milam
*Hemphill County	Canadian	Hemphill
*Dimmit County Memorial	Carrizo Springs	Dimmit
*Houston County	Crockett	Houston
Floresville Memorial	Floresville	Wilson
*Mauritz Memorial-Jackson County	Ganado	Jackson
Holmes Community	Gonzales	Gonzales
*Blackwell	Gorman	Eastland
Community Memorial	Grapeland	Houston
Waller County	Hempstead	Waller
Hico City	Hico	Hamilton
*Medina Memorial	Hondo	Medina
Hubbard	Hubbard	Hill
L.B.J. Memorial	Johnson City	Blanco
Hardin Memorial	Kountze	Hardin
Edgar B. Davis Memorial	Luling	Caldwell
Meridian	Meridian	Bosque
Newton County Memorial	Newton	Newton
Nocona General	Nocona	Montague
Frio	Pearsall	Frio
Ranger County Hospital District	Ranger	Ranger
*San Saba Memorial	San Saba	San Saba
*Shiner Hospital Foundation	Shiner	Lavaca
Stephenville	Stephenville	Erath
West Community	West	McLennan
Yorktown Memorial	Yorktown	DeWitt
SOUTH DAKOTA		
Douglas County Memorial	Armour	Douglas
Marshall County Memorial	Britton	Marshall

*formally withdrew

Hospital	Town	County
SOUTH DAKOTA(continued)		
Canton-Inwood Memorial	Canton	Lincoln
Custer Community	Custer	Custer
Eureka Community	Eureka	McPherson
Freeman Community	Freeman	Hutchinson
Madison Community	Madison	Lake
Bennett County Community	Martin	Bennett
*McLaughlin Hospital District	McLaughlin	Corson
Hand County Memorial	Miller	Hand
St. Benedict	Parkston	Hutchinson
Platte Community Memorial	Platte	Charles Mix
Pioneer Memorial	Viborg	Turner
Jerauld County Memorial	Wessington Springs	Jerauld
Baptist Hospital of Winner	Winner	Tripp
IOWA		
Western Iowa		
*Kossuth County	Algona	Kossuth
Alta Memorial	Alta	Buena Vista
Community Memorial	Hartley	O'Brien
Floyd Valley	Le Mars	Plymouth
Municipal	Orange City	Sioux
Hegg Memorial	Rock Valley	Sioux
Osceola Community	Sibley	Osceola
Central Iowa		
Audubon County	Audubon	Audubon
Belmond Community	Belmond	Wright
Hancock County	Britt	Hancock
Lucas County Memorial	Chariton	Lucas
Community Memorial	Clarion	Wright
DeWitt Community	DeWitt	Clinton
*Dyersville Community	Dyersville	Dubuque
Eldora Community	Eldora	Hardin
Central Community	Elkader	Clayton
Jefferson County	Fairfield	Jefferson
*Adair County Memorial	Greenfield	Adair
Guthrie County Memorial	Guthrie Center	Guthrie
John McDonald	Monticello	Jones
Ringgold County	Mount Ayr	Ringgold
Story County	Nevada	Story
St. Joseph Community	New Hampton	Chickasaw
Mitchell County Memorial	Osage	Mitchell
Clarke County Public	Osceola	Clarke
Community Memorial	Postville	Allamakee
Story City Memorial	Story City	Story
Community Memorial	Sumner	Bremer
Madison County Memorial	Winterset	Madison

*formally withdrew

APPENDIX B

SELECTION OF THE COMPARISON HOSPITAL GROUP

SELECTION OF THE COMPARISON HOSPITAL GROUP

A sample of 60 comparison hospitals from rural communities in Texas, Iowa, and South Dakota was selected to permit comparisons of RACC hospitals with similar hospitals in the project states. The comparison sample was designed for use primarily in the financial and utilization components of the evaluation.

The procedure for selection of the comparison hospitals consisted of a non-random sampling from a universe of 253 hospitals located in the project states but not participating in the swing-bed experiments. Since the procedure was employed to select those rural hospitals which had cost structures most similar to the RACC hospitals, the comparison hospitals were selected on the basis of their similarity to RACC hospitals in terms of the following variables, which are potentially related to hospital cost:[1]

(1) Location in a rural (non-SMSA) county
(2) Number of acute care beds
(3) Presence of an extended care facility
(4) Presence of an outpatient department
(5) Presence of an emergency department
(6) Occupancy rate
(7) Acute care length of stay
(8) Total cost per patient day
(9) Presence of an intensive care unit
(10) Presence of a nursery
(11) The ratio of payroll cost to total hospital cost
(12) JCAH certification
(13) Full-time equivalent staff members per patient day
(14) The month in which the hospital's fiscal year ended

All comparisons were based on 1975 data, the last pre-experimental year. American Hospital Association data and data obtained from Medicare intermediaries were used in the selection process. Availability of data imposed a major constraint on the variables which could be used.

Sampling was carried out using a computerized algorithm designed to select those comparison hospitals "closest" to the swing-bed hospitals. This was accomplished by matching each RACC hospital with a comparison hospital similar to it in terms of the 14 variables listed above. Since the variables are all related to hospital costs, and the aim of the sampling procedure was to choose hospitals having cost structures similar to the swing-bed hospitals, the comparison hospitals sampled from the universe of potential matches yielded a multivariate empirical distribution function for the comparison sample which was approximately the same as the distribution function for the swing-bed hospitals.

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[1]The ISBP comparison hospitals were selected in a similar manner.

The procedure began by selecting for the first RACC hospital, that comparison hospital which was closest to it in terms of a multivariate distance measure based upon the variables listed above. Proceeding sequentially in this manner, a comparison hospital was matched with each RACC hospital. The computer program used for the matching procedure provided a variety of options including the ability to: (1) force or exclude certain matches on the basis of prior knowledge (such as the likelihood that the administrator of a certain comparison hospital would not cooperate in the study); (2) use screening procedures to restrict potential matches to only those comparison hospitals which satisfied certain conditions (such as total number of beds within a 25% range of the number of beds for the swing-bed hospital under consideration); (3) weight the relative importance of the different matching variables in terms of their contribution to the overall distance measure; (4) iterate through the potential control data several times, progressively loosening various criteria (such as the criterion in (2) above) in order to obtain matches for hard-to-match RACC hospitals; and (5) standardize the data prior to the conduct of the procedure in order to place all matching variables on the same scale. Again, it is important to emphasize that random sampling was not employed since the major purpose of the comparison group was to facilitate certain analyses which required a comparison group of hospitals selected on the basis of similar cost-related attributes.

A statistical summary of the results of the sampling procedure is presented in Table B.1. As indicated in the table, the comparison hospital sample is on the average, more similar to the RACC hospitals than the universe of comparison hospitals. In the three instances in which the difference between the RACC hospitals and the potential comparison hospital group was statistically significant at less than the .10 level, the statistical significance of the difference was greatly reduced by use of the matching procedure. The mean bed size of the sampled universe, which was significantly larger ($p<.001$) than that of the RACC hospitals, was reduced enough to eliminate the statistical significance of the difference ($p=.468$). The significant difference in occupancy rates between the RACC hospitals and the universe ($p<.001$) was only partially reduced by the matching procedure, with the 46% and 52% occupancy rates for the RACC hospitals and the comparison hospitals still significantly different ($p=.015$). In order to reduce differences on other critical variables, this compromise with respect to occupancy was necessary. The third noteworthy difference was in the presence of an intensive care unit (ICU) which can substantially influence the cost structure of a hospital. The selection of the comparison hospitals resulted in the reduction of the significant difference (from $p=.063$ to $p=.854$) between the universe and the RACC hospitals. In general, especially with respect to variables which were significantly different between RACC hospitals and the universe of comparison hospitals, the matching procedure was reasonably successful in yielding a group of comparison hospitals relatively similar to RACC hospitals.

TABLE B.1:

Variables Used in the Matching Procedure for the Selection of the Comparison Hospital Group.

		RACC Hospitals	Comparison Hospital Sample		Comparison Hospital Universe	
		(N=60)	(N=60)	Sig.[1]	(N=253)	Sig.[1]
Number of acute care beds	Mean	36.700	38.907	.468	46.431	<.001
	St. Dev.	15.637	17.667		22.703	
Presence of ECF	Mean	.033	.033	1.000	.043	.724
	St. Dev.	.181	.181		.204	
Presence of outpatient dept.	Mean	.017	.033	.563	.043	.205
	St. Dev.	.129	.181		.204	
Presence of emergency dept.	Mean	.767	.783	.829	.836	.288
	St. Dev.	.427	.415		.380	
Occupancy rate	Mean	.462	.517	.015	.569	<.001
	St. Dev.	.109	.133		.141	
Acute care length of stay	Mean	6.812	6.416	.495	6.664	.761
	St. Dev.	3.555	2.716		3.331	
Total cost per patient day	Mean	93.505	94.388	.857	100.294	.114
	St. Dev.	29.400	24.036		29.940	
Presence of intensive care unit	Mean	.400	.417	.854	.534	.063
	St. Dev.	.494	.497		.500	
Presence of nursery	Mean	.867	.867	1.000	.866	.983
	St. Dev.	.343	.343		.342	
Ratio of payroll cost to total cost	Mean	.532	.542	.463	.520	.148
	St. Dev.	.059	.052		.057	
JCAH accreditation	Mean	.933	.950	.700	.960	.437
	St. Dev.	.252	.220		.195	
FTE staff members per patient day	Mean	.008	.008	.679	.009	.692
	St. Dev.	.002	.002		.003	

[1]Value is the exact p-value, or significance level, associated with sample t-test for mean difference between the RACC hospitals and the comparison hospital sample and the comparison hospital universe.

Source: American Hospital Association (AHA) Hospital Survey

A discriminant function analysis was conducted, comparing the RACC hospitals with the universe of comparison hospitals and then with the comparison hospital sample, to ascertain whether the indicated groups differed with respect to their overall multivariate profiles on the matching variables. A function was obtained which discriminated between the RACC hospitals and the potential comparison hospitals at a significance level less than .001. It was not possible to obtain a function which discriminated significantly between the RACC hospitals and the control hospitals (p=.494). Consequently, in an overall sense, it can be concluded that the comparison hospitals are not significantly different from the RACC hospitals with respect to the cost-related variables chosen for purposes of selecting the comparison sample.

APPENDIX C

NURSING TIME STUDY

NURSING TIME STUDY

The Nursing Time Study was intended to gather information on the amount of time spent with swing-bed and acute care patients by nursing staff in a sample of swing-bed experimental hospitals. Results of the study were used in the financial component of the evaluation to allocate certain routine care costs to acute and swing-bed patients and in the quality component as a potential correlate of the quality of care in swing-bed hospitals. The respective chapters of this report discuss in detail the manner in which these results were used. This appendix describes the hospitals involved, the data collection procedure, reliability checks performed, and the final results of the time study.

A. HOSPITAL SAMPLE

The Nursing Time Study was administered in those hospitals comprising the sample selected for administration of the Long-Term Care Survey. Hospitals were selected on the basis of high swing-bed utilization.[1] Implementation of the time study in these hospitals had the advantage of exercising greater control over data collection procedures through direct instruction to nursing staff by evalution staff personnel who were at the hospital to administer the Long-Term Care Survey.

B. DATA COLLECTION PROCEDURE

Data on nursing staff time spent in providing patient care were collected for one 24 hour period in each hospital. Patient care time spent was recorded for all swing-bed patients and for a randomly chosen sample of acute care patients.[2] For time spent in patient care provided directly to patients in their rooms, a time recording form was placed on the door of each patient room. (The Data Forms Supplement contains a copy of this form). Nursing staff were asked to record the time spent with each patient (to the nearest half minute), their staff position (RN, LPN, or aide), and their initials, each time they left the room. For time spent in patient care outside patients' rooms (whether provided directly to the patient or indirectly in the form of medication preparation, or chart work, etc.) similar recording forms were placed at nurses stations, medication rooms, and other appropriate locations. A second form was used for recording aggregate patient census and nurse staffing information (a copy of which is also in the Data Forms Supplement).

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[1]High utilization in this instance means one to three swing-bed patients on an average day and is thus representative of the experimental experimental experience.

[2]The random sample of acute care patients included both Medicare and non-Medicare patients.

The evaluation staff nurse/researcher (who also administered the Long-Term Care Survey) selected the acute care patient sample, posted all time recording forms, and instructed nursing staff members in their use. Since the nurse/researcher's time at the hospital included parts of both day and evening shifts, she was able to personally instruct the majority of the nursing staff in the use of the time recording forms. Upon completion of the 24 hour time study period, all forms were mailed to the evaluators.

C. RELIABILITY PROCEDURES

The conduct of the time study included a reliability testing procedure to assess the accuracy of the recorded data. On seven occasions in five different facilities, the nurse/researcher personally observed and recorded time spent by nursing staff in patient care in the patients' own rooms. The observed time was then compared with the time recorded by nursing staff on the time study recording sheets. The 207 occasions of service observed by the nurse/researcher were divided into two groups and examined separately. Those which were observed by the nurse/researcher and recorded by nursing staff (there were 167 of these) were analyzed to determine the error rate for time recording. The remaining observations (40), which were never recorded by nursing staff but were observed by the nurse/researcher, were analyzed separately to estimate the degree of non-reporting among nursing staff.

Table C.1 presents descriptive statistics on the 167 observed and recorded occasions of service. Mean time recorded by nursing staff was 4.63 minutes per occasion of service, compared to a mean observed time of 4.51 minutes--a difference of .12 minutes. The difference between the two means, which was not statistically significant at the .10 level, represents an over-recording rate of 2.7%.

In addition to the comparision of means, three one-way analyses of variance were performed to determine whether significant differences existed between recorded and observed times by type of patient (acute vs. swing-bed), staff position (RN, LPN, or aide), or shift (day or evening). The significance of the F values for main effects in the three ANOVA's were .762, .946, and .018, respectively, indicating that only shift had a significant effect on the difference between recorded and observed time. The average difference between recorded and observed time on the day shift was .62 minutes, compared to -.05 minutes for the evening shift. If an average difference of zero represents perfect accuracy, then the evening shift is significantly more accurate (closer to zero) than the day shift.

Table C.2 presents information on the 47 occasions of service observed by the nurse/researcher but not recorded by nursing staff. Overall, the 101.5 minutes of unrecorded patient care time represent 11.9% of the 854.5 total minutes of time observed by the nurse/researcher. The average length of unrecorded occasions of service was 2.54 minutes. The table also indicates that there were significant differences

TABLE C.1:

Comparison of Recorded and Observed Nursing Staff Time per Occasion of Service.

Nursing Staff Time per Occasion of Service	Recorded Time (minutes)	Observed Time (minutes)	Difference Between Recorded & Observed Time (minutes)
Mean (p=.337)[1]	4.63	4.51	.12
St. Dev.	6.00	5.58	1.61
Median	2.96	2.79	.03
Minimum	0.50	0.50	-7.00
Maximum	42.00	38.50	7.00

[1]Value in parentheses is the exact p-value, or significance level, associated with the two sample t-test for mean differences.

Source: Nursing Time Study

between acute and swing-bed patients and between the day and evening shifts in the amount of non-reporting. In terms of patient type, significantly more time was unrecorded for swing-bed patients (17.0%) than for acute care patients (9.9%). Insofar as shift was concerned, a significantly greater amount of time was unrecorded in the evening shift (17.6%) than in the day shift (5.5%). This was the case despite the greater accuracy shown by evening shift personnel when time was recorded.

D. TIME STUDY FINDINGS

Analysis of time recorded for patient care time not spent in providing care directly to patients in their rooms (such as time spent in charting, etc.) indicated a general failure of nursing staff to completely record this type of activity. Thus, it was decided to utilize time spent in patients' rooms (the reliability of which could be assessed) in the analytic components of the evaluation. Patient care time not spent in patients' rooms was assumed to have been spent in the same proportion

TABLE C.2:

Amount and Percentage of Unrecorded Nursing Staff Time by Patient Type and Shift.

Type of Patient	Total Unrecorded Time (A) (minutes)	Total Observed Time (B) (minutes)	A/B
Acute	61.5	619.5	9.9%
Swing-Bed	40.0	235.0	17.0%
Total	101.5	854.5	11.9%
	Fisher's Exact Test (p=.035)		
Shift[1]			
Day	22.0	402.0	5.5%
Evening	79.5	452.5	17.6%
Total	101.5	854.5	11.9%
	Fisher's Exact Test (p=.001)		

[1]No reliability studies were carried out during the night shift.

Source: Nursing Time Study

as that spent in patients' rooms. Two adjustment factors were used to calculate nursing staff time per patient day for acute and swing-bed patients in each time study hospital: one factor adjusted for non-reporting and the other for inaccuracy in time reported. These two factors were developed by type of patient and shift. For purposes of correction, the night shift was grouped with the evening shift. For example, acute care day shift time from the time recording forms was multiplied by: (1) .8625 (1-(.62/4.51) to correct for the over-estimation found to exist on the day shift; and then by (2) 1.059 (a combined correction factor based upon type of patient and shift) to correct for non-recording on the day shift. After correction factors

were applied, total patient care time per patient day was obtained by summing the adjusted values for the 24 hour time study period for each patient.

Across all patients in all hospitals, the average total nursing staff time per patient day was 129.4 minutes and the standard deviation was 81.8. For acute care patients the corresponding values were 126.0 and 82.3; for swing-bed patients 140.5 and 79.6. While swing-bed patients displayed a higher usage of staff time the difference between the two mean values was not statistically significant (p=.82). These adjusted time values were the ones used in the quality and financial components of the evaluation described in the body of this document. These results differ from those of the Utah swing-bed evaluation reported in Shaughnessy et al. (1978b). However, it is difficult to account for the differences, since information on possible explanatory factors such as differences in acute or swing-bed patient characteristics or the availability of non-nursing staff as substitutes for nursing staff, was not available.

APPENDIX D

SERVICE QUALITY CATEGORIES

SERVICE QUALITY CATEGORIES

As described in Chapter V, Section C, the service quality scores were designed to measure the adequacy of provision of each service required by each patient problem and formed the basis for the computation of the problem, patient, and facility quality scores developed for this evaluation. The 151 unique services were organized into 14 general categories for analytic purposes in order to identify the specific service areas where quality deficiencies might occur. All services are presented below by these service categories.

Social-Recreational Services:

Radio, talking books, records, handicrafts
Reading material with large print
T.V., reading material, handicrafts
Religious programs
Maintain, encourage ties with family
One-to-one relationships
Encourage return to previous hobbies, activities
Assist with appearance
Promote increased interaction with staff
Provide meaningful group activities
Provide meaningful solitary activities
Expose to community resources
Conduct open houses for family and friends
When no family or friends, arrange for substitutes
Allow visiting with few restrictions and lots of privacy
Privacy for family with patient
Magnifying lens, adequate light

Therapeutic/Mental Health Services:

Emotional support
Safe, familiar environment
Psychological assessment
Social history and evaluation
Reassurance
Reality orientation
Therapeutic activity program
Supportive psychotherapy
Remotivation techniques
True reassurance/empathy
Relaxation techniques
Short-term psychotherapy
Therapeutic communication
Make decisions for patients, gradually promoting self-control
Counseling
Conduct structured conferences with family, staff
Counsel with family
Emotional/social supports

Reinforcement through behavior modification
Psychological evaluation
Provide inservice training/counseling
Counseling for both patient and family
Refer early to appropriate community agencies
Provide follow-up service
Electroshock therapy

Physical and Occupational Therapies:

ROM exercises, exercise program
Hot compresses or whirlpool
Ultraviolet and/or infra-red treatment
ADL training
Cane, walker
Ambulation
Exercise/activity program
Heat application to painful area
Cold packs
Assistive ambulatory and/or non-ambulatory support devices
Gait training
Physical assessment therapy
Warm compresses, soaks

Speech Therapy:

Speech therapy
Lip reading, sign language training
Speech loss program

Inhalation Therapy:

Oxygen therapy
IPPB treatments

Sensory Compensation Services:

Hearing test
Glasses, contact lenses
Hearing aide
Hearing loss program
Dentures

Laboratory Services:

Lab wound culture and sensitivity
Blood proteins
Electrolytes
BUN
SMA-12
CBC

Urinalysis
Sputum culture
Arterial blood gases
Pulmonary function tests
Biochem screen
Urine culture and sensitivity
Urine ph

EKG:

EKG

Radiology:

Chest x-ray
x-rays

Professional Nursing Services:

Nursing assessment
Sterile wound irrigation/soaks
Ear irrigations
Nasal-pharyngeal suctioning
Postural drainage
Force fluids (2000-3000 cc in 24 hours)
Force fluids (2400 cc in 24 hours)
Indwelling foley catheter care

Non-Professional Nursing Services:

B.P., pulse, respiration
Temperature
Intake and output
Weight
Maintain cleanliness and dryness
Topical lotions applied and areas massaged
Water, air flotation mattress/pad
Position changed
Force fluids (1500 cc in 24 hours)
Bowel program
Bladder program
Dressings changed
Force fluids (2000 cc in 24 hours)
Elevate affected extremity
Support hose
Semi-fowler sitting position
Breathing exercises
Avoid contact with irritants/well-ventilated environment
Force fluids (2000-4000 cc per 24 hours)
Enemas
Protective skin care

Urine specific gravity
Perineal care
Minimum fluid intake (2000 cc per 24 hours)
Skin care (air mattress, massage, lotions, clean, dry)
Safety precautions
Safe environment
Encourage cessation of smoking
Oral hygiene

Physician Services:

Medical exam and prescribed treatment
Medical screening and evaluation of visual acuity
Medical exam and testing for hearing loss
Medical exam and evaluation of speech disorder/loss

Dietary Services:

High protein diet
High protein, low sodium diet
Low calorie diet
Restricted sodium diet
High calorie protein diet, Vitamin B supplement
High roughage diet
Low roughage diet
Dietary plan

Pharmacy:

Analgesics for pain
Antibiotics
Diuretics
Bronchodilators
Steroids
Laxatives
Antidiarrheals
Antibiotic antibacterial
Antipyretic
Psychotropics
CNS stimulant
Vasodilator
Antidepressants
Tranquilizers
Minor tranquilizers (anti-anxiety drugs)
Analgesics/non-narcotic
Analgesics/narcotic
Phenothiazines, antidepressants
Antihypertensives
Bowel softeners
Potassium supplement

APPENDIX E

MEDICARE REIMBURSEMENT FOR PATIENT CARE SERVICES

MEDICARE REIMBURSEMENT FOR PATIENT CARE SERVICES

Reimbursement to hospitals under Medicare for inpatient care is carried out in the following manner. On an interim basis throughout the fiscal year, the hospital submits a claim for each Medicare patient to the Medicare fiscal intermediary which reimburses the hospital for up to 100% of the claimed amount if the claim is in compliance with Medicare criteria. The amounts reimbursed are termed "periodic interim payments (PIP)" and do not represent the final settlement of these claims. Final reimbursement to the hospital is made on the basis of the lesser of billed charges or costs incurred in the treatment of Medicare patients. Therefore, at the end of its fiscal year, each hospital files a Statement of Reimbursable Cost (referred to in this report as Medicare Cost Report, or MCR) which is used to calculate the final (as opposed to the interim) payment by Medicare for services rendered to Medicare patients.

Hospitals are required first to use cost-finding procedures which allocate the overhead portion of hospital expense to revenue producing departments to determine the full cost of patient care. Different procedures are used to apportion the cost of routine and ancillary services to Medicare inpatients.[1] In the case of routine acute care, full routine care costs are separated into labor and non-labor costs. Non-labor costs are divided by total patient days to derive routine non-labor cost per patient day, which is multiplied by the number of Medicare patient days to give total Medicare routine non-labor cost.

Two different labor costs are calculated for routine care: (1) average routine labor cost per patient day, defined as total routine labor cost divided by total patient days, and (2) adjusted labor cost per patient day, which is calculated in a similar manner except that nursing salaries and the number of aged (over age 65), pediatric (under age 14), and maternity patient days are all increased by 8.5% before division.[2] This is referred to as the 8.5% nursing differential and was designed to reflect the greater use of nursing staff resources by these three categories of patients.

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[1]Routine services may be defined as "the regular room, dietary, and nursing services, minor medical and surgical supplies, and the use of the equipment and facilities for which a separate charge is not customarily made." Ancillary services are "diagnostic or therapeutic services performed by specific departments as distinguished from general or routine care, such as room and board." (Wood 1975, Appendix F)

[2]Swing-bed patient days were not included in this procedure.

Medicare total routine labor cost is arrived at by (1) multiplying the number of Medicare aged, pediatric, and maternity patient days by adjusted cost per patient day, (2) multiplying the remaining number of Medicare patient days by average cost per patient day, and (3) adding the two amounts.[3] Total Medicare routine acute care cost is the sum of Medicare labor and non-labor cost.

Medicare routine long-term care cost (normally incurred only in hospitals providing care in distinct-part facilities) is determined by (1) dividing full distinct-part routine care cost by total long-term care patient days to obtain routine long-term care cost per patient day and (2) multiplying that amount by the number of Medicare long-term care patient days.

For ancillary services provided to acute and long-term care Medicare patients, the percentage of full ancillary cost in each department attributable to Medicare patients is considered to be equal to the percentage of total departmental charges which are covered charges to Medicare patients. For example, if 23% of the total charges for a given ancillary department are covered charges to Medicare patients, then the cost of treating these Medicare patients is considered to be 23% of the full cost of providing ancillary services to all patients.

As indicated, Medicare pays the lesser of total billed charges or total (routine plus ancillary calculated as described above) costs of treating Medicare patients as final settlement of claims. After the lesser of the two amounts is identified, deductibles and co-insurance payable by other payers (including patients themselves) are subtracted and the remainder, the amount due from Medicare, is compared to the total of the periodic interim payments received throughout the fiscal year. Hospitals return overpayments to Medicare, while underpayments result in additional revenues to the hospital.

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[3]Medicare pediatric, maternity, and non-aged days are attributable to persons who are entitled to Medicare benefits because of disability.

APPENDIX F

AVERAGE VARIABLE COST METHOD
FOR CALCULATION OF INCREMENTAL
COST

AVERAGE VARIABLE COST METHOD FOR CALCULATION OF INCREMENTAL COST

A. SUMMARY OF THE VARIABLE COST ADJUSTMENT METHOD

One of the purposes of the swing-bed experiments was to take advantage of the fixed cost base of rural hospitals in order to provide long-term care. Consequently, the only costs expected to vary with long-term care utilization under the experiment were variable costs. Assuming no new fixed costs were incurred in the delivery of long-term care, it is necessary to apportion variable costs to acute care and long-term care. To simplify the discussion, the following methods are explained in terms of routine care cost only. If it is possible to obtain the unit variable cost of acute care and the total variable cost of acute care, then it is possible to calculate the unit variable cost of swing-bed care. That is, since (1) total variable cost is simply the sum of acute and swing-bed variable costs; (2) acute care variable cost is the number of acute patient days times the variable cost per acute care patient day; and (3) the number of swing-bed days is known, then the only unknown is the unit variable cost per swing-bed day, which can be obtained since total variable cost is known.

Thus, it is necessary to estimate unit acute care variable cost in order to apply this method. Heuristically, this is done by calculating the difference in total routine cost from one time period to the next (where the hospital did not provide swing-bed care in either period), adjusting for inflation and capital expansion, and attributing the residual to acute care utilization differences from one time period to the next. Assuming no changes in the fixed cost base except those for which an adjustment is made, this cost change is a pure variable cost change and, using the difference in patient days between the two time periods, it can be used to estimate variable cost per patient day. The algebraic formulas involved in carrying out these calculations are specified on the following pages.

Having obtained unit acute variable cost, it is then possible to apportion total variable cost in a later time period (after adjusting for inflation) between acute and swing-bed care. In the following technical discussion, it is initially assumed that the unit variable cost for acute care has been obtained and that the problem is, therefore, to apportion variable cost per bed day available between acute and swing-bed care. Once this method has been discussed, then the details on how to estimate unit variable cost for acute care are presented. The reason cost per bed day available is used as the basic cost measure is that it takes into consideration changes in the number of beds (i.e., capital expansion) in the hospital.

B. TECHNICAL DETAILS ON THE VARIABLE COST ADJUSTMENT METHOD

Table F.1 lists the notation used in the discussion. Since the swing-bed experiments began in 1976, the years of interest are 1974 and 1975 (the pre-study years) and 1976-1978 (the study years).

TABLE F.1:

Notational Conventions

FC_j = Fixed cost of routine care (for one hospital) for jth year, where j=4, 5, 6, 7, 8, etc., depending on whether the year under consideration is 1974, 1975, 1976, 1977, or 1978.

VC_j = Variable cost of routine care for jth year.

TRC_j = Total hospital routine cost for the jth year, ($TRC_j = FC_j + VC_j$).

ABD_j = Acute care bed days available for jth year (includes only general service bed days available).

APD_j = Acute care patient days for jth year.

$AOCC_j$ = Acute care occupancy rate for jth year ($AOCC_j = APD_j/ABD_j$).

$AUVC_j$ = Acute care unit variable cost or acute care variable cost per acute care patient day in year j.

$LUVC_j$ = Long-term care unit variable cost, or long-term care variable cost per long-term care patient day in year j. This is the incremental cost per swing-bed care patient day.

(i) = Indicates a cost variable has been adjusted for inflation from one year to the next. For example, $TRC_5(i)$ represents an estimate of TRC_6 obtained by inflating TRC_5 by an inflation rate between year 5 and year 6.

Since the experiments were not in effect in years 4 and 5, but went into effect initially in year 6, the first two years represent a baseline period, and the third year represents the first year of the swing-bed experiments. The purpose of the following procedure is to derive an expression for $LUVC_6$ in terms of variables which can be empirically determined.

(1) $TRC_5 = FC_5 + VC_5$

$$= FC_5 + (AUVC_5 \times APD_5)$$

and

(2) $TRC_6 = FC_6 + VC_6$

$$= FC_6 + (AUVC_6 \times APD_6) + (LUVC_6 \times LPD_6).$$

Subtracting total routine cost after adjusting for inflation yields

(3) $TRC_6 - TRC_5\ (i) = \Delta TRC_{56}\ (i)$

$$= (FC_6 - FC_5(i)) + (AUVC_6 \times APD_6) - (AUVC_5(i) \times APD_5) + (LUVC_6 \times LPD_6).$$

Assuming the inflation adjustment is correct, then $FC_6 = FC_5(i)$ if the fixed cost base of the hospital has not changed. In order for this type of equality to hold if there has been a change in beds between years 5 and 6, it is appropriate to divide by bed days available. Hence, the equality becomes

(4) $FC_6/ABD_6 \simeq FC_5(i)/ABD_5$

with $\Delta\ TRC/BD_{56}(i) = TRC_6/ABD_6 - TRC_5(i)/ABD_5$, equations (3) and (4) yield

(5) $$\Delta\ TRC/BD_{56}(i) \simeq \{AUVC_6 \times APD_6/ABD_6\} - \{AUVC_5(i) \times (APD_5/ABD_5)\} + \{LUVC_6 \times (LPD_6/ABD_6)\}.$$

Assuming that unit variable cost changes only because of inflation, we can say that

$AUVC_5(i) \simeq AUVC_6$

and

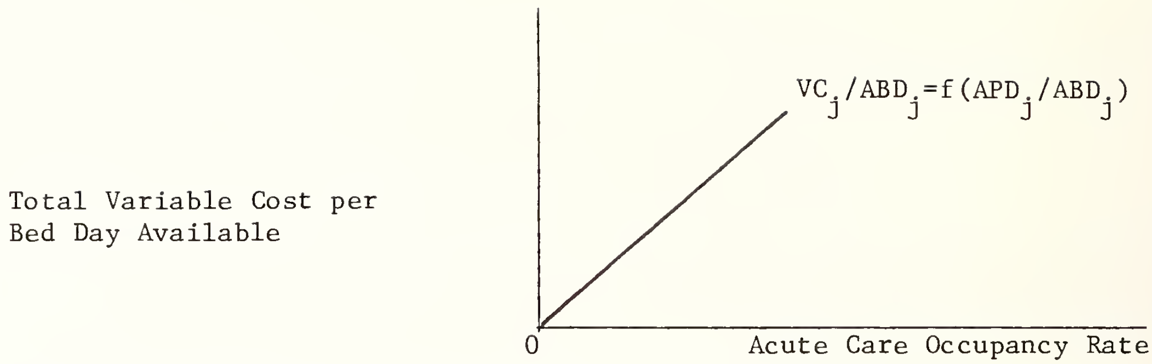
(6) $$\Delta TRC/BD_{56}(i) = AUVC_6 \times \{(APD_6/ABD_6) - (APD_5/ABD_5)\} + \{LUVC_6 \times (LPD_5/ABD_6)\}.$$

or

(7) $$LUVC_6 = (ABD_6/LPD_6) \times [\Delta TRC/BD_{56}(i) - AUVC_6 \times \{(APD_6/ABD_6) - (APD_5/ABD_5)\}].$$

Up to this point, it has been assumed that $AUVC_6$ was available. The following discussion indicates how $AUVC_6$ can be calculated. The subscripts j and k are used to denote years (prior to the experimental years) in which the hospital did not provide long-term care.

Assuming that variable cost per bed day available is a linear function of acute days, variable cost per bed day available can be depicted as shown below.



With f(*) linear, it is possible to write variable cost per day bed available as

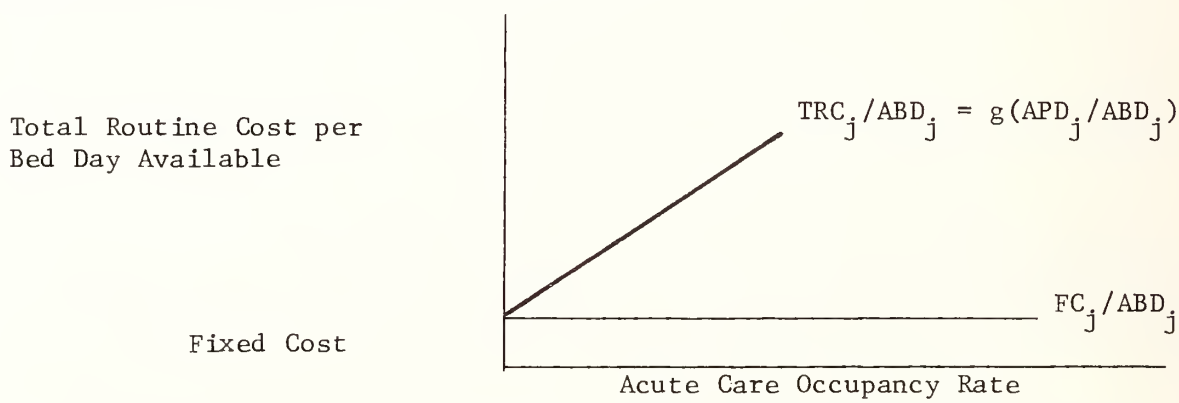
(8) $VC_j/ABD_j = a_j \times (APD_j/ABD_j) + b_j$.

Since the notion of pure variable cost requires that variable cost per bed day available be zero when acute care patient days are zero, the line must pass through the origin and therefore $b_j = 0$. Consequently, a_j is the acute unit variable cost since it is multiplied by the number of "units", APD_j, to product VC_j.[1] In other words,

(9) $a_j = AUVC_j$.

The assumption of a linear total cost function is a simplifying one and used here to demonstrate the general approach to incremental cost. This method can also be used when the function is assumed to be non-linear.

Since total routine cost per bed day available can be written as the sum of fixed and variable costs, the figure below shows total cost per bed day available as a function of acute patient days.



Clearly, g(*) is also assumed linear with slope a_j and intercept FC_j/ABD_j.

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[1]Stated formally, the first derivative or slope of the variable cost line is the change in variable cost per bed day available per unit change in occupancy rate, or marginal (incremental) cost per acute care day.

That is,

$$(10)\quad TRC_j/ABD_j = \{a_j \times (APD_j/ABD_j)\} + FC_j/ABD_j.$$

This equation indicates that it is possible to estimate a_j empirically with two observations on the same hospital at times k and j. Properly adjusting for inflation, assuming that time k precedes time j, and recalling "(i)" indicates "inflation adjusted," then

$$(11)\quad FC_k(i)/ABD_k = FC_j/ABD_j$$

and

$$(12)\quad a_k(i) = a_j.$$

Using equations (10), (11), and (12), it follows that

$$(13)\quad \Delta TRC/BD_{kj}(i) = (TRC_j/ABD_j) - (TRC_k(i)/ABD_k)$$
$$= a_j \times \{(APD_j/ABD_j) - (ABD_k/ABD_k)\}.$$

or that

$$(14)\quad AUVC_j = a_j = \Delta TRC/BD_{kj}(i)/\{(APD_j/ABD_j) - (APD_k/ABD_k)\}$$
$$= \{TRC_j/ABD_j) - (TRC_k(i)/ABD_k)\}/\{(APD_j/ABD_j) - (APD_k/ABD_k)\}.$$

Assuming that the hospital began participation in the experiment in year 6 and that k and j pertain to years 4 and 5 respectively, then the estimate for long-term care unit variable cost given by equation (7), with equation (14) substituted, is given by

$$(15)\quad LUVC_6 = (ABD_6/LPD_6) \times [(TRC_6/ABD_6) - (TRC_5(i)/ABD_5) - AUVC_5(i)$$
$$\times \{(APD_6/ABD_6) - (APD_5/ABD_5)\}].$$

where

$$AUVC_5(i) = AUVC_6 = [\{(TRC_5/ABD_5) - (TRC_4(i)/ABD_4)\}/\{(APD_5/ABD_5) -$$
$$(APD_4/ABD_4)\}](i).$$

Since acute occupancy rates for the jth year can be written as $AOCC_j = APD_j/ABD_j$, this expression can be written more simply using acute occupancy rates. Letting the difference in occupancy rates from one year to the next be rewritten as $\Delta AOCC_{kj}$ - $AOCC_j$ - $AOCC_k$ and using the earlier "Δ" notation for changes in costs, (15) becomes

$$(16)\quad LUVC_6 = (ABD_6/LPD_6) \times \{\Delta TRC_{56}/ABD(i) - AUVC_5(i) \times \Delta AOCC_{56}\}.$$

While the preceding discussion of the variable cost adjustment procedure used total routine costs to derive total swing-bed care unit variable cost, use of the method is not inherently restricted to total costs. It is

possible to use the method to estimate LUVC for individual cost centers or groups of cost centers. Swing-bed care unit variable cost was calculated for a number of individual cost centers (laundry and linen, operation and maintenance of plant, dietary, housekeeping) and for the total cost of routine care. This is done through substituting in equation (16) the appropriate costs in place of TRC.

Since the variable cost adjustment technique assumes that all changes in cost from year to year are attributable only to changes in capital expansion, inflation, or utilization, it was important that the adjustments be made with care. Capital expansion and utilization are accounted for in the formulas through algebraic manipulation. Inflation is dealt with by multiplying cost per bed day available by an inflation rate. Two general alternatives were considered in developing inflation adjustments. First is the use of published data on input price inflation. The Consumer Price Index was not at all useful in this area, since the items included in them do not represent the mix of goods and services consumed by hospitals. Another source of inflation indices is the American Hospital Association, which calculates a number of different input price inflation measures by geographical region and hospital bedsize (not stratified by both variables at the same time, however). If it can be shown that service mix, case mix, etc., do not appear to be changing over time in the experimental hospitals, then the input price inflation rate would be the best inflation measure. The applicability of such published data also depends on the extent to which total cost inflation calculated on a regional or bed size only basis captures the expected total cost behavior of the experimental hospitals.

The second alternative for calculating inflation rates involves the computation of change in total costs from year to year. Although not an inflation rate in the traditional sense of the word, use of the percentage change in total cost per bed day available can be regarded as a method of adjusting for inflation. This method was used in this evaluation through use of a comparison group of hospitals chosen especially for their similarity to the experimental hospitals in a number of areas, including cost structure. (Appendix B of this report gives a complete description of the hospital comparison group selection procedure). Actual and percentage changes in cost per bed day available in the comparison hospitals from year to year were calculated, resulting in a measure of the inflation rate which served as the inflation adjustment applied to equation (16).

In calculating the precentage change in comparison hospital costs from year to year, it was necessary to adjust for changes in cost due to factors not associated with inflation, such as capital expansion (addition of beds) which was taken into account by using change in cost per bed day available. In addition, the costs used to calculate the yearly changes must correspond to the level at which the variable cost adjustment method is being applied. For example, when individual cost center swing-bed care cost was investigated, then the inflation adjustment was derived using year to year cost changes in only the corresponding cost centers in the comparison hospitals. Similarly, when total routine long-term care cost was predicted, then the inflation factor was calculated using the same cost in control hospitals.

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